Coal Age

JUNE, 1955

A McGRAW-HILL PUBLICATION — PRICE 50c

Rope Wear Licked

How Hanna Coal boosted rope life five-fold on its 46-yd shovels, to get better than 2,200,000 yd per rope. p 54

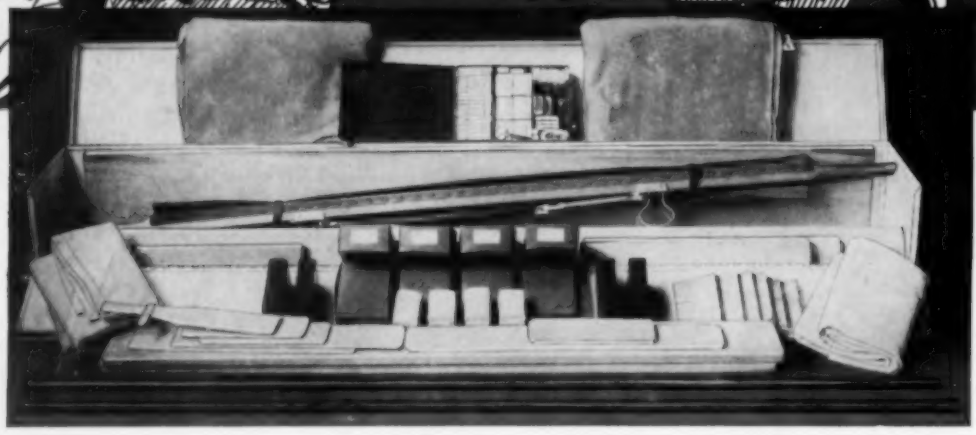
Power-Plant Mine

Mechanized Viking mine loads coal efficiently and safely, moving output directly into power-plant storage. p 60

Full Contents on p 5

1955 AMC Coal Show—Convention and Equipment Report... p 78

Increase your Team's chance of Winning with the M.S.A. CONTEST OUTFIT and TRAINING MATERIALS. . .



Your team gains greater speed and efficiency, both in training and in actual competition, with the M.S.A. Contest Outfit and training materials. All required materials are neatly arranged, easy to see, instantly accessible. This means you can select the right materials, at the right time and bring your team to a quick, point-winning solution to every accident problem.

The Contest Outfit box is made of strong steel and finished in white. Its design, resulting from years of experience with first aid practice and competition, prevents loss of materials, and contributes to neatness and efficiency. Strong handles on each end of the box make it easy to carry. Write for details.

CONTENTS

- 1 Army-Type Stretcher
- 2 Pieces Canvas 6′ x 8′
- 2 Single Wool Blankets
- 6 1 yd. Packages Picric Gauze
- 6 1 yd. Packages Sterile Gauze
- 1 1 oz. btl. Aromatic Spirits of Ammonia
- 1 Horn Spoon
- 6 Paper Drinking Cups
- 1 Metal Box for dressings
- 1 Set of 15 Wood Splints
- 1 Pair 4″ bandage Scissors
- 2 Army-Type Tourniquets
- 48 40″ Triangular Bandages, unsterilized
- 12 1″ Compress Bandages, unsterilized
- 12 2″ Compress Bandages, unsterilized
- 18 4″ Compress Bandages, unsterilized
- 2 7′ lengths ¾″ Pipe for improvised stretcher
- 4 Wood Blocks for heat applications
- 6 U. S. Bureau of Mines First Aid Manuals
- 2 Padlocks
- 1 Strong Steel Box, as illustrated

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Photo courtesy J. Robert Baxley, Inc., Pottsville, Pa.

Hose gulps a lake to rescue a coal mine

A typical example of B. F. Goodrich improvement in rubber

BENEATH this lake are coal mines that can be worked again if they can be reached. Drop some pipe in, and pump the 12-billion-gallon lake dry? The water is loaded with acid that eats steel. Use rubber hose? The water is full of silt and stones that tear rubber to shreds.

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did better than he knew!

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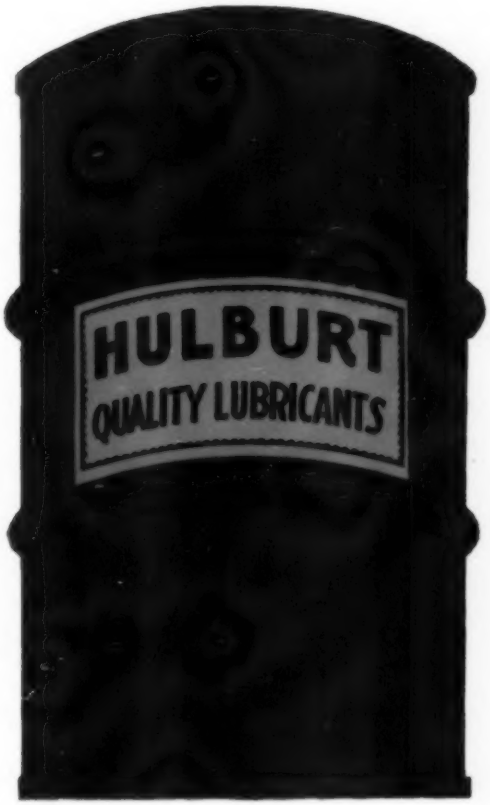

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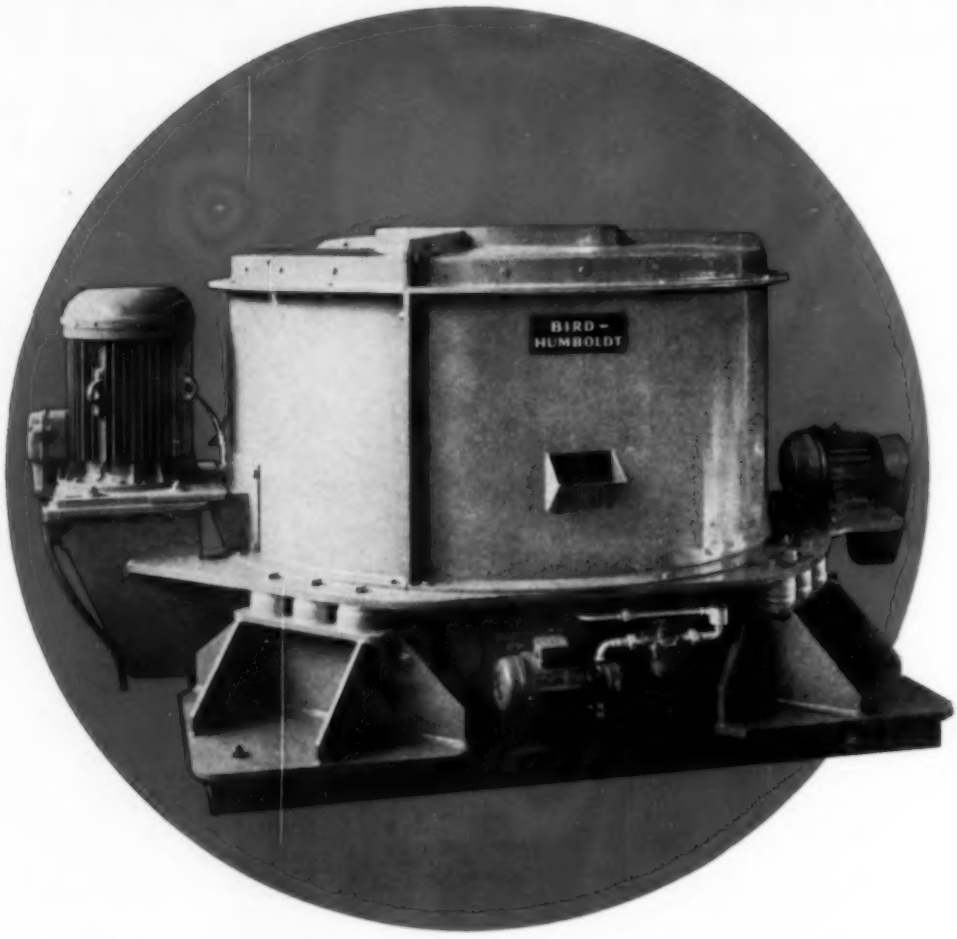

In This New Half-Horsepower-Per-Ton
BIRD-HUMBOLDT CENTRIFUGAL DRYER
For Fine Coal

Get the story on this new and better unit before you spend a dollar in dewatering equipment.

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on the Bird-Humboldt is just off the press. May we mail you a copy?

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Coal Age

JUNE • 1955

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Coal With Air

Good lump-coal percentage, reliability, safety and low over-all breaking cost are the results of 3 yr of experience with air-breaking equipment in 30-in coal at the Wyoming mine of the Red Jacket Coal Corp. For a report on equipment, methods and results, including use of semiportable compressors parked at belt heads, see July *Coal Age*.

Better Stripping

What are the steps that will pay off the most in raising stripping efficiency? Recent developments indicate that improved drilling and blasting lead the list. In line with this, the July *Coal Age* will carry a report on how the Colonial Coal Mining Co. went about improving its practice in these directions and what the results were.

Big Little Plant

"The most for the money and the biggest little tipple you ever saw" summarizes the new all-steel plant serving the Big Creek mine of the Merrill Coal Co. In size, 16 ft by 48 ft 8 in; in capacity, 160 tph, the plant loads three sizes and includes a raw-coal bin built on two railroad cars, also crushing and mixing facilities. See July *Coal Age*.

Overseas Designs

A yield of 140 tpd from a 170-ft face on a 70-deg pitch in a 3-ft vein, without a man at the face, is one of the achievements of Ruhr mining men in their search for new machines and methods to raise efficiency in long-walling and steep-pitch mining. A summary of these new developments, distilled from a report by an experienced American observer, is scheduled for early presentation in the feature columns of *Coal Age*.

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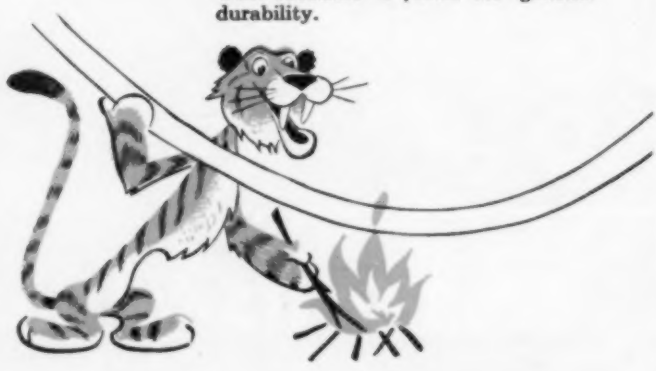

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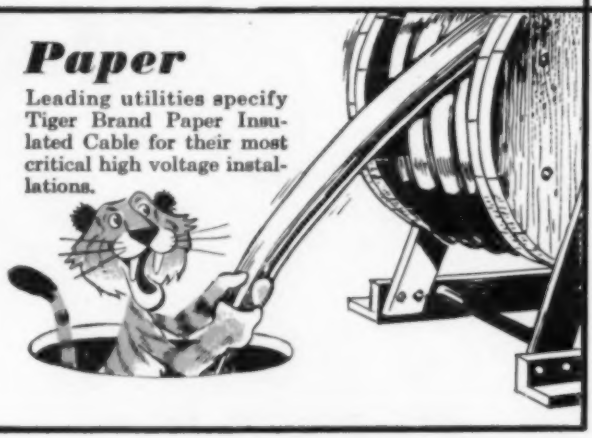

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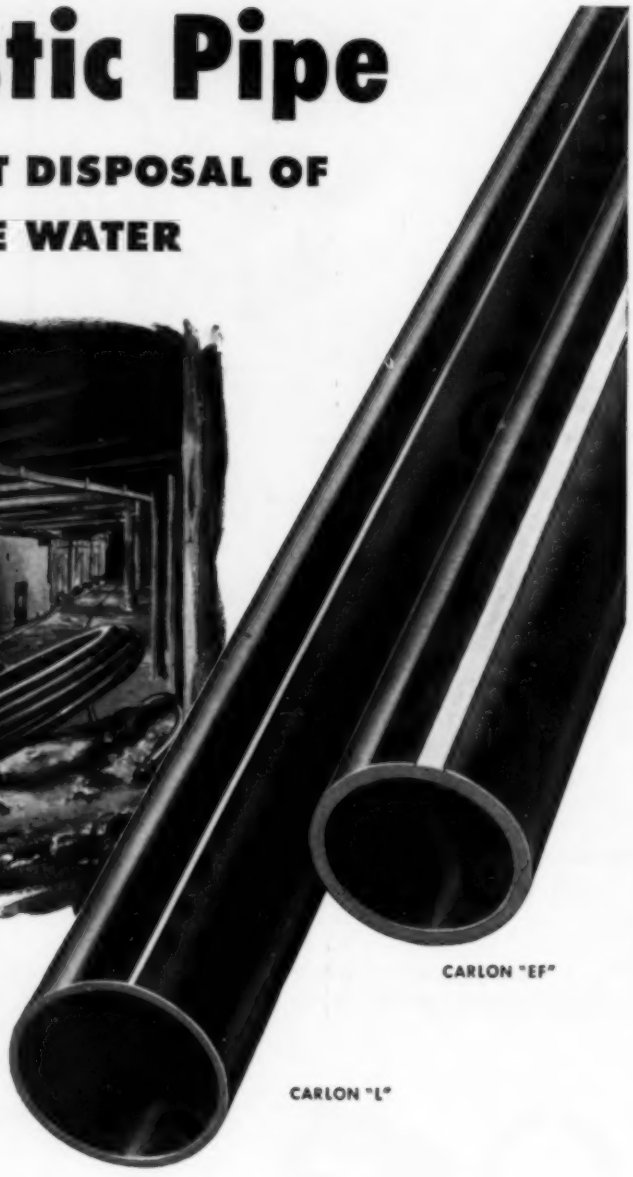

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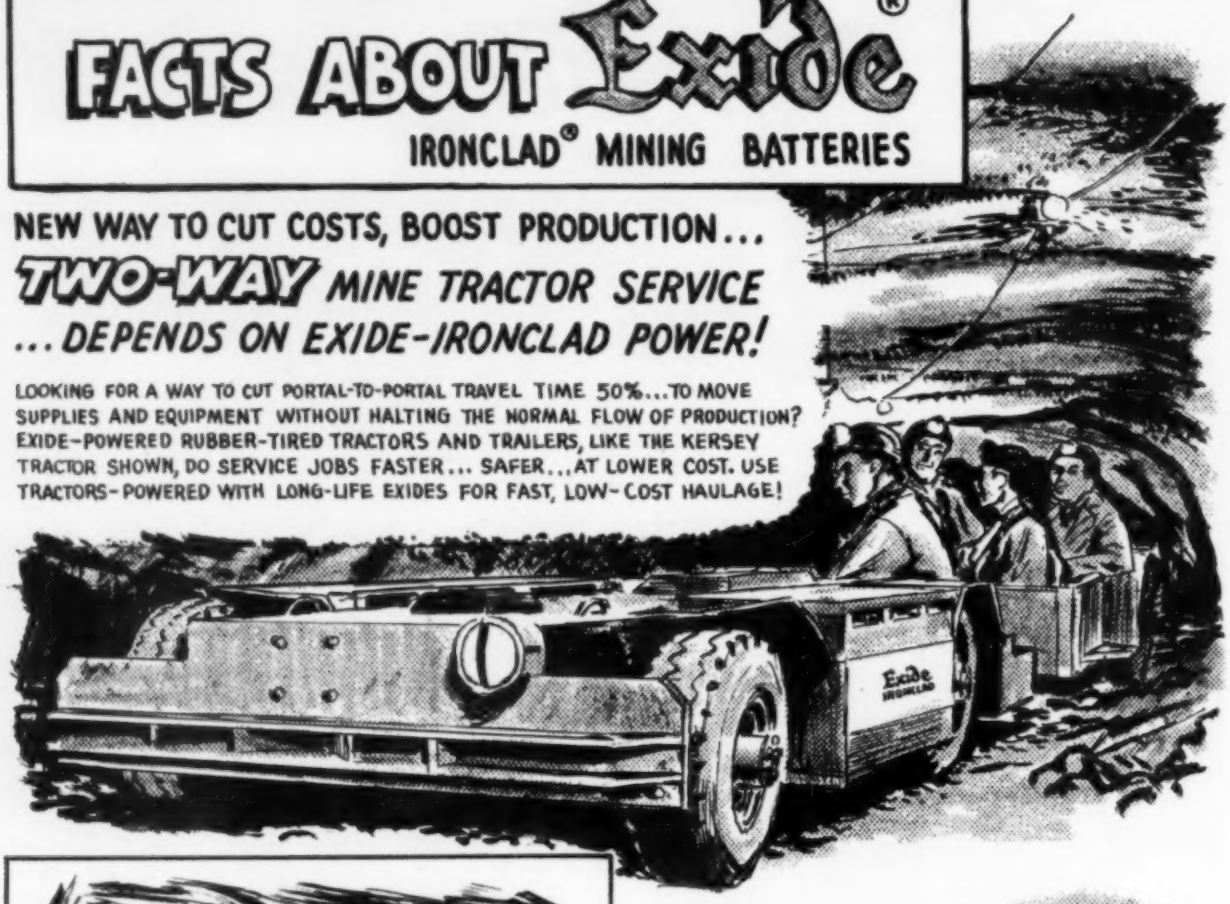

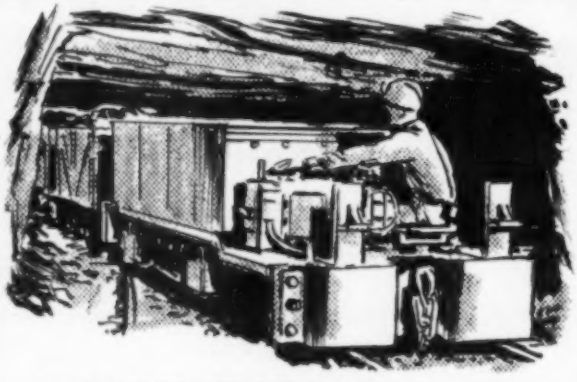

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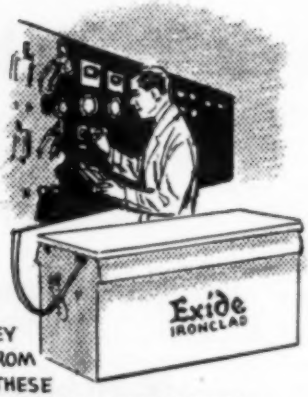

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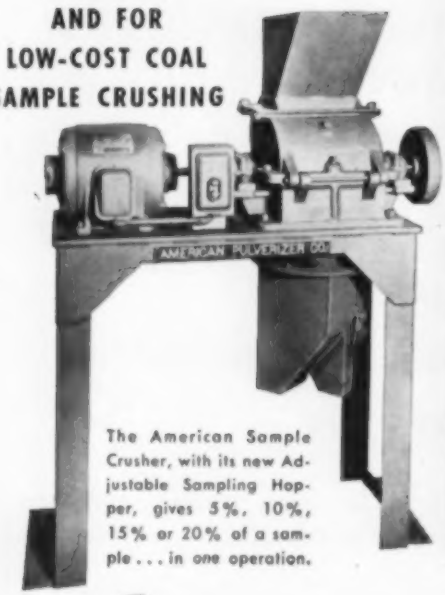

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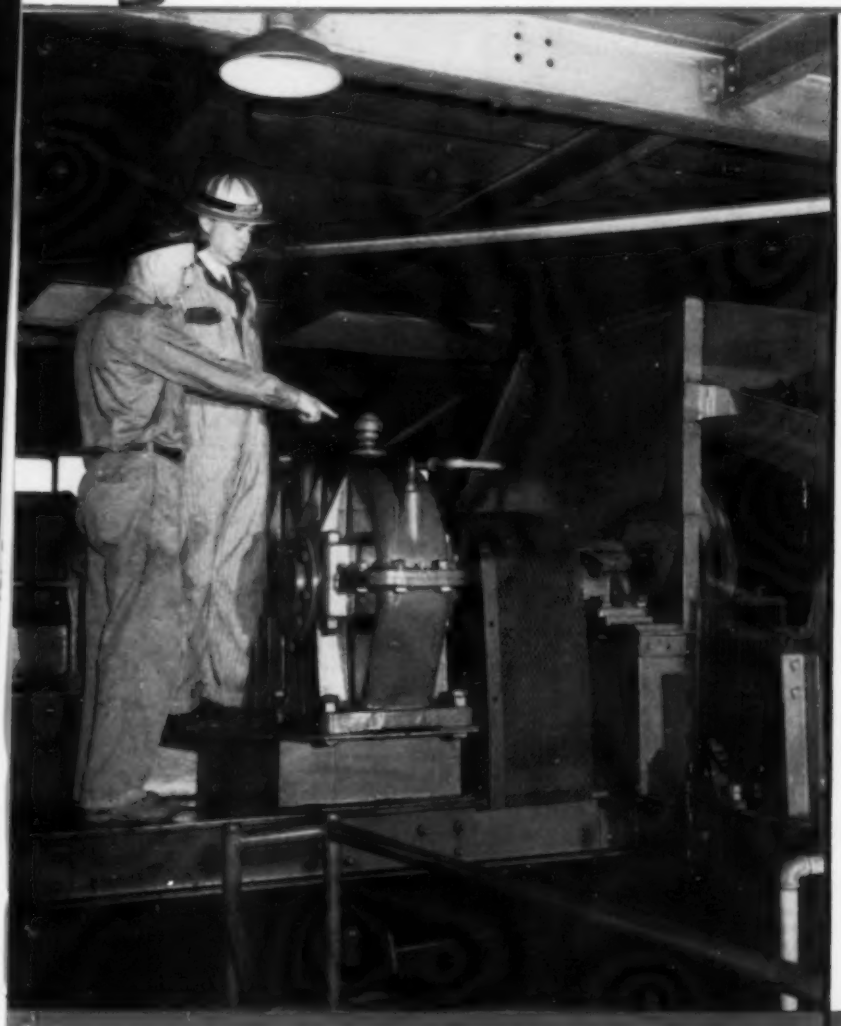
Speed reducer at Fairview Collieries Corp. uses STANOIL *Industrial Oil– operates 5 years with no mechanical maintenance*



Management of Fairview Collieries Corp., Danville, Illinois, had had experience with STANOIL Industrial Oil. So when it came to selecting an oil for a speed reducer in the preparation plant, the choice was easy—STANOIL.

The speed reducer is connected to a belt conveyor that moves nearly 10 tons of coal per minute. A shut down of the speed reducer means the conveyor belt stops and the whole plant shuts down. Obviously this is no place for oil failure. Obviously, too, it *is* the place for STANOIL Industrial Oil.

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Bert Richardson (left), Preparation Plant Superintendent, and Fred A. Barnes, Standard Oil lubrication specialist inspect Jones speed reducer at Fairview Collieries. Fred Barnes' customers have found that he is a good man to call in on lubrication matters. Fred has had 18 years' experience providing lubrication technical service to Standard Oil customers. He's a graduate of James Millikin University and of the Standard Oil Engineering School.

STANDARD OIL COMPANY
(Indiana)

STANDARD

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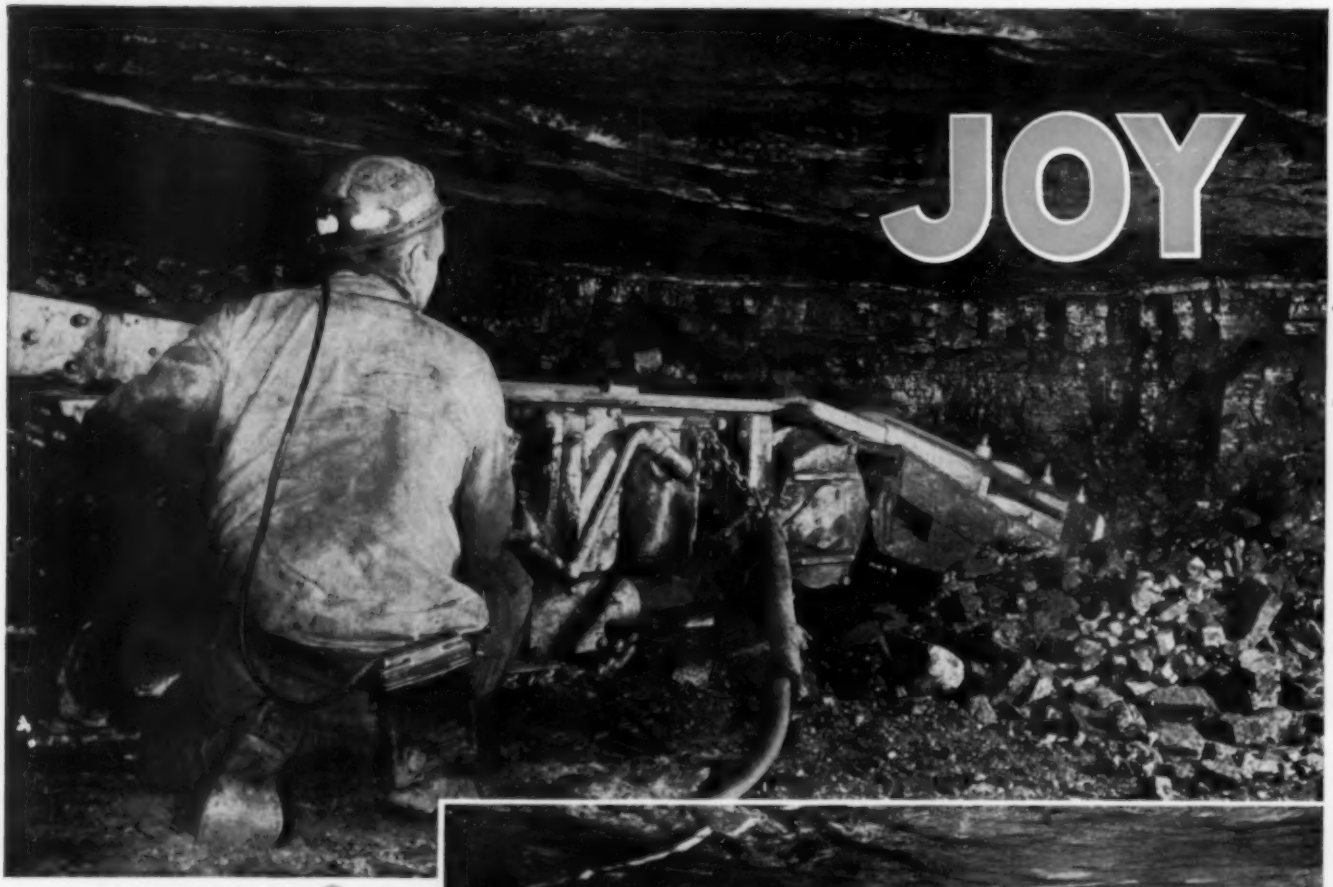
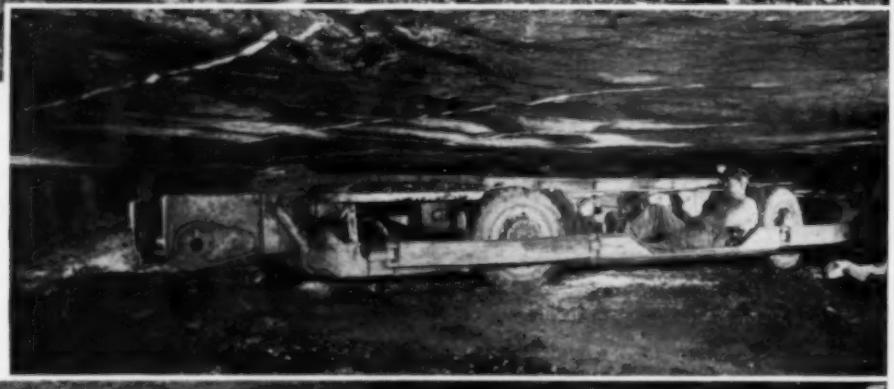
5 **Excellent Demulsibility.** STANOIL is refined to eliminate emulsion problems, contains additive to minimize foaming.





20-BU LOADER

8-SC SHUTTLE CAR

12-RB CUTTER

"12-20-8" COMBINATION

AVERAGES 950 TONS A DAY (2 SHIFTS)

HERE'S the typical operating performance of a Joy low-vein equipment team, recorded during a recent three-month period.

Two 12-RB rubber-tired cutters, two 20-BU loaders and four 8-SC shuttle cars, operating in a West Virginia mine on a "two-working, one-off" shift basis, are producing an average of 950 tons of coal every day . . . and have reached peaks of 1200 tons per day.

The mine is operating in the Peerless Seam, in coal that varies in height from 35″ to 37″. A channel sample shows analysis of 3% ash, 1% sulphur. The bottom is fire-clay, and the top is normally very hard slate, but there is a draw slate varying from 1″ to 3″ in thickness that comes with the coal. This draw slate is not picked before the loading operation underground, but is removed by a man at the outside and near the belt head piece. Main haulage consists of two Joy MTB-30 belt conveyors, 1000 and 2600 feet long respectively.

The total number of men on the payroll is 55 on three shifts, with the third shift consisting of five men on equipment-greasing and supply duties. Production per man-day therefore varied from 17.3 tons average to 21.8 tons at the peak—a highly favorable rate in 36″ coal.

In every coal-producing area and under all seam conditions, Joy mining equipment is setting the records for low-cost, high-production operation. Let us work with you. ***Joy Manufacturing Company, Oliver Building, Pittsburgh 22, Pa.*** In Canada: *Joy Manufacturing Company (Canada) Limited, Galt, Ontario.*

12-RB CUTTER

A rubber tire-mounted, mobile cutting machine only 26″ high, supplied either as a bottom cutter or top cutter. Hydraulic tramming, steering and controls, with hydraulic pump driven by a separate motor. Ample capacity to keep out in front of the loader.

20-BU LOADER

Over-all height is only 24″, yet maximum capacity is 8 tons per minute. Employs the exclusive Joy loading principle. Gathering arms and conveyor are independently driven. Has swinging tail conveyor, individual crawler-tread drive, and exclusive Magnetax control.

8-SC SHUTTLE CAR

Rubber tire-mounted, highly flexible and maneuverable. Only 26″ in height, with a level capacity of 2 tons, the 8-SC has four-wheel positive drive, four-wheel hydraulic steering, and four-wheel Joy single-disc brakes—also hydraulically-driven cable reel and hydraulically-adjustable elevating discharge.

Consult a Joy Engineer

JOY

WORLD'S LARGEST MANUFACTURER OF UNDERGROUND MINING EQUIPMENT

W&D CL5449

"Our TD-24s Worked 15,000 Hours Before Trade-in"

TWIN GIANTS. Worked as a matched pair, the Cleghorn TD-24s and BULL-GRADERS peel 70-foot overburden off an 8-foot seam of coal.

POWERFUL BUT POISED, the TD-24s work the rocky overburden off the seam into the worked-out section of the 200-acre lease.

David Wiltse, strip foreman for big West Virginia operator finds INTERNATIONAL TD-24s tops for performance, durability.

L. E. Cleghorn is one of the biggest strip mine operators in West Virginia, and at his mine near Clarksburg he gets up to 15,000 hours hard work from INTERNATIONAL TD-24s removing 70 foot of overburden from an 8-foot seam.

David Wiltse, in charge of laying bare this coal seam, tells how he gets the job done:

"We are repeat INTERNATIONAL *TD-24 crawler users because they have given us excellent production with very low down-time. Our old TD-24s worked up to 15,000 hours before being traded. The record actually speaks for itself. Each of our TD-24s has outproduced any of the other crawlers we have used. The way TD-24s work steep terrain or in the mud plus long tractor life makes them 'Champs of the Strip'!"*

Want more proof? Just reach for that telephone and tell your International Industrial Power Distributor to bring out the IH crawler and equipment sized for your diggings. You add up the score on the comparative performance you see and then you'll know how much production and profit you can gain working with INTERNATIONALS.

INTERNATIONAL HARVESTER COMPANY, CHICAGO 1, ILL.

INTERNATIONAL HARVESTER

INTERNATIONAL
INDUSTRIAL POWER

MAKES EVERY LOAD A PAYLOAD

Advertisement

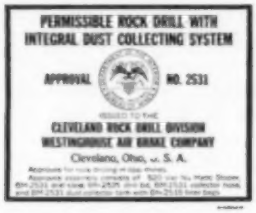
Revolutionary New Stoper for Drilling Roof-Bolt Holes Now Available

Since the very beginning of roof-bolting as applied to coal mines, the Cleveland Rock Drill Division has devoted a great deal of time and effort to provide the miner with a better method of producing roof-bolt holes. We have long realized that the equipment available to the miner, including our own, was not entirely satisfactory. In the past, stopers have been much heavier than necessary, and this excess weight has become a very serious factor, particularly in the lower coal seams. In the past there has been no stoper that would operate satisfactorily and efficiently in coal under about 36".

Wet drilling, as a method of dust suppression, has not been acceptable to the coal miner, and dust collection systems have been both cumbersome and inefficient. Machine maintenance has been high and in some very difficult conditions it has been excessive.

The Cleveland Model S20 Vac-Nu-Matic Stoper has many new features that simplify previous roof-bolt drilling problems

With the foregoing in mind, the Cleveland Rock Drill Division has designed an all new stoper that *eliminates causes for complaint found in other roof-bolting stopers.* The result is the Cleveland Model S20 Vac-Nu-Matic Stoper mounted on the Drift-Nu-Matic Feed, a *new bit* designed particularly for use with our dust collection system, a *new type of drill steel* and an entirely *new dust collection system.* These items are discussed at length in the following paragraphs.



Close-up view of S20 Vac-Nu-Matic Stoper

The Model S20 Vac-Nu-Matic Stoper, together with the Vac-Nu-Matic Bit, Vac-Nu-Matic Steel, and the Vac-Nu-Matic Dust Box, were designed to be operated as a unit. Substitutions for any one, or all, of these units will result, at the best, in unsatisfactory operation and, what is more probable, no operation at all. In designing these various parts to operate as a unit, we were not activated by a desire to produce a package unit. The simple facts are that all of the units mentioned are interdependent in their operation, and in order to achieve certain definite results, it was necessary to design components that would produce those results.

New design provides for short overall height — operates easily in 26-inch coal

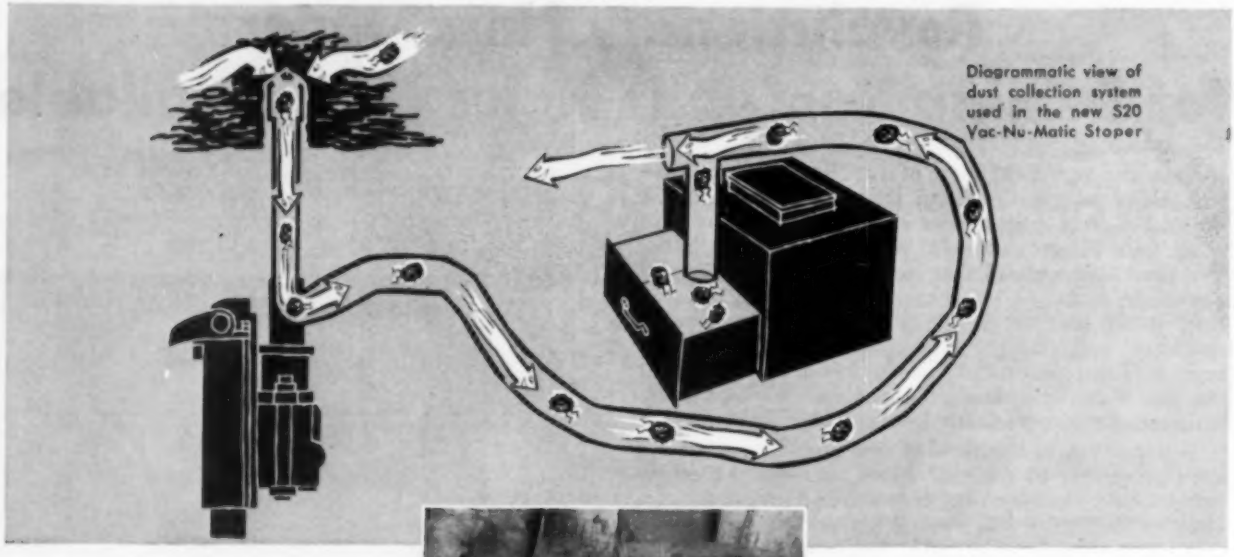
The Model S20 Vac-Nu-Matic Stoper is a standard percussion type drill up to a certain point; beyond that point it was necessary to go into complete new design. The basic problem was to design a machine that would have the shortest possible overall length. In any conventional model of percussion type drill, only two points present themselves where the machine can be materially shortened. By removing the valve from the inside of the machine and by using an external valving mechanism, we eliminated considerable length.

Novel Sav-A-Change Chuck speeds the roof-bolt drilling operation — reduces number of steel changes

The only other point susceptible to any material shortening is in the design of the chuck. We have designed this machine with two chucks available — the standard socket type and the Sav-A-Change, or peg type of chuck. The Sav-A-Change is a completely new departure in chuck design and enables us, in most cases, to drill a hole four inches deeper than the seam height, without using coupled steel and without drilling an oversized starter hole to enable us to cock the steels that follow. Dust collection through either type of chuck is the same.

Sav-A-Change Chuck

No steel is lost in chuck in Sav-A-Change design. Holes can be drilled four inches deeper



Diagrammatic view of dust collection system used in the new S20 Vac-Nu-Matic Stoper

Unique Built-in Dust Collection System prevents machine wear — handles wet top

The S20 Vac-Nu-Matic Stoper is the only stoper having a built-in dust collection system that does not remove (or pass) the cuttings through the body of the machine, nor does it use any type of external hood, or dust collection tube. Cuttings are removed through the side of the chuck housing immediately after they leave the drill steel. They are collected from the face through holes in the bit and down through the center of the drill steel.

S20 Solid Stoper Piston

Solid forged parts provide greater strength for longer service life

By eliminating the dust collection through the machine itself, we have been able to seal the machine from external dirt, and since a dust collection tube through the machine is not required, we were able to design solid parts for longer life. The piston is a solid forging and has no holes through the center. The rifle bar is also a solid forging and likewise has no center hole.

Vac-Nu-Matic Dust Box handles wet top easily

Chuck assembly is designed with new principle that permits replacement of chucks underground without dismantling machine

The chuck itself is a solid piece of metal and is not splined to the rotation mechanism as it is in conventional designs. The rotation mechanism consists simply of three slots in the chuck which match similar slots in the chuck sleeve, and the connection is through three small round pins. The entire chuck assembly is retained in the chuck housing by means of a simple snap ring, and the chuck can be replaced without dismantling the machine. The only tool necessary to replace the chuck is a pair of snap ring pliers. This means that chucks may be replaced underground without the necessity of sending the machine to the machine shop or to the surface.

A unique design has been adopted in controlling the flow of dust and cuttings through the chuck. In this design, wear, attributable to particles of rock impinging on steel surfaces, has been eliminated. The chuck has been so designed that at all points where the directional flow changes a slight build up of dust and cuttings is allowed, thereby allowing the cuttings themselves to protect the steel parts and absorb the wear.

Only snap-ring pliers needed to change S20 chuck

New-type chuck practically free from reciprocating wear

The chuck itself is a floating design. In all present chuck styles the drill rod has a reciprocating action within the chuck. This reciprocating action, combined with the inevitable dirt that finds its way into the chuck, adds up to a wearing or grinding action that, in severe cases, can cause a chuck to become inoperative in a shift, or less. Our new chuck design allows the chuck to float with the steel and eliminates practically all wear due to reciprocation. Inasmuch as the chuck can be sealed off from the rest of the machine, no dirt gets into the body of the machine either from drilling, or from what might normally be carried into the chuck from dirty drill shanks.

S20-Vac-Nu-Matic lightest weight dust-collection type of stoper on the market

The S20 Vac-Nu-Matic Stoper is the lightest dust collection type of stoper on the market. It weighs sixty-nine pounds complete, in the 28″ feed size. Other standard feeds available are 46″ and 64″.

Need for low overall height and long feed led to the development of the Drift-Nu-Matic feed

In order to achieve an exceptionally long feed, together with very low height, it was necessary to disregard former feeds and standards of mounting.

With this in mind, the Drift-Nu-Matic Feed was designed. This is an air piston combined with a chain in such a manner that the travel of the machine itself is double the travel of the feed piston. This is the only stoper in which the drill always starts its feed travel at the bottom of the stoper. Regardless of the lengths of feed, the overall starting height of the machine is the same.

In conventional type stopers, whether they are telescopic or otherwise, the starting height of the machine varies according to the length of the feed leg. The overall starting height of the S20 Stoper in all cases is 16½″, which means that the length of your starter steel in any case is the difference between 16½″ and your seam height, or, in the case of the Sav-A-Change Chuck, the overall height governing the starter steel length is 20½″. This means that in practically all cases, at least one steel change is eliminated as opposed to conventional type stopers. In some cases, two steel changes are eliminated.

Note unusual shape of Vac-Nu-Matic Bit

Cleveland air-operated bit knock-off machine

Unusual Vac-Nu-Matic bit gives key to success of dust collection system and Sav-A-Change Chuck

At the other end of the system we have the Vac-Nu-Matic Bit. This bit is the result of several hundred design experiments and was selected for a number of outstanding qualities. In the first place, it is an exceptionally fast cutting bit. It has adequate pick-up area to insure that all dust and cuttings are collected through the bit itself.

It is designed with an offset shoulder. This feature makes the bit entirely free cutting which, in turn, means that drill steel will always drop out of the hole freely. There are no stuck steels using the Vac-Nu-Matic Bit.

This bit is the key not only to the dust collection system but to the stoper itself, as it would be impossible to use a Sav-A-Change chuck with other types of bits. With the Sav-A-Change type of chuck the steel must drop out of the hole freely. The connection between the Vac-Nu-Matic Bit and the drill steel is the standard CRD taper connection.

New type steel also aids in positive dust collection

The Vac-Nu-Matic Steel is standard in its external appearance and has a standard CRD taper connection on the end. It has, however, been rolled with a large hole in the center to insure complete dust collection. The large hole is necessary for satisfactory operation. The large hole does not weaken the steel beyond acceptable limits. Field testing of this type of drill rod over a period of several months has revealed no steel breakage whatsoever.

Vac-Nu-Matic Dust Box pulls high vacuum — uses little air

The Vac-Nu-Matic Dust Box is of our standard design with the exception of the venturi. A completely new venturi has been designed that operates on 18 cubic feet of air per minute.

Eighteen cubic feet of air per minute at eighty (80) pounds pressure will produce a static vacuum of 16½″ of mercury; fluid vacuum, while the machine is operating, is 13″ of mercury. These figures compare to ten to twelve inches static and as low as ½″ fluid in competitive dust collection systems. Cuttings pass into the collection box through a series of baffles which insure that the dust pan fills evenly. Filter bags separate the dust collection chamber from the vacuum chamber.

The box has a capacity of 1¼ cubic feet which is the approximate equivalent of ten 1⅜″ diameter holes of average depth. One of the serious problems in dust collection boxes has been the very considerable wear factor due to impingment of dust particles on the metal surfaces inside the box. Here again we have designed to the end that dust is allowed to accumulate at wear points to the extent that it covers and cushions these points and absorbs the wear. There is very little wear in any part of the Vac-Nu-Matic Dust Box and no dust or cuttings passes through the venturi, thus eliminating wear at that point.

S20 is also designed for use with jumbos

Brief summary high-spots the advantages of new S20 Vac-Nu-Matic Stoper design

The Model S20 Vac-Nu-Matic Stoper and dust collection system was especially designed for roof-bolting. It is suitable for any seam height and is the only practical stoper in seams from 36" down to 26". The stoper, dust collection system, steel, and bits are designed as a unit and are interdependent, to produce an exceptionally fast drilling machine with superior free cutting and dust collection qualities. The design of the bit promotes fast cutting action, together with perfect dust collection, and the drill rods will always drop free out of the hole. There is less rotational drag on the machine and no stuck steels even in soft ground.

The drill steel has an oversized opening that passes all cuttings freely. The dust collection system operates with very low air consumption and an exceptionally high vacuum to insure complete collection. Cuttings are removed from the drill at the chuck housing and do not pass through the drill. Because of the large openings and the high vacuum, wet top presents no problem in dust collection. Our tests indicate that we can collect dust that, when taken from the collection box, will adhere together, and may be balled like a snowball. The design of the Vac-Nu-Matic Stoper is such that it is suitable for use either as a hand-held machine or for jumbo mounting.

First basic change in stoper design since the advent of the self-rotator

The Model S20 Vac-Nu-Matic Stoper, together with its Drift-Nu-Matic Feed, represents the first basic change and improvement in stoper design since the self-rotator.

It is the only stoper that will drill in a hole deeper than the height of the coal seam, without coupled steels.

It is the only stoper that will drill a deeper hole with one steel change than any standard stoper will with two changes.

It is the only stoper that allows chuck replacement without dismantling the machine.

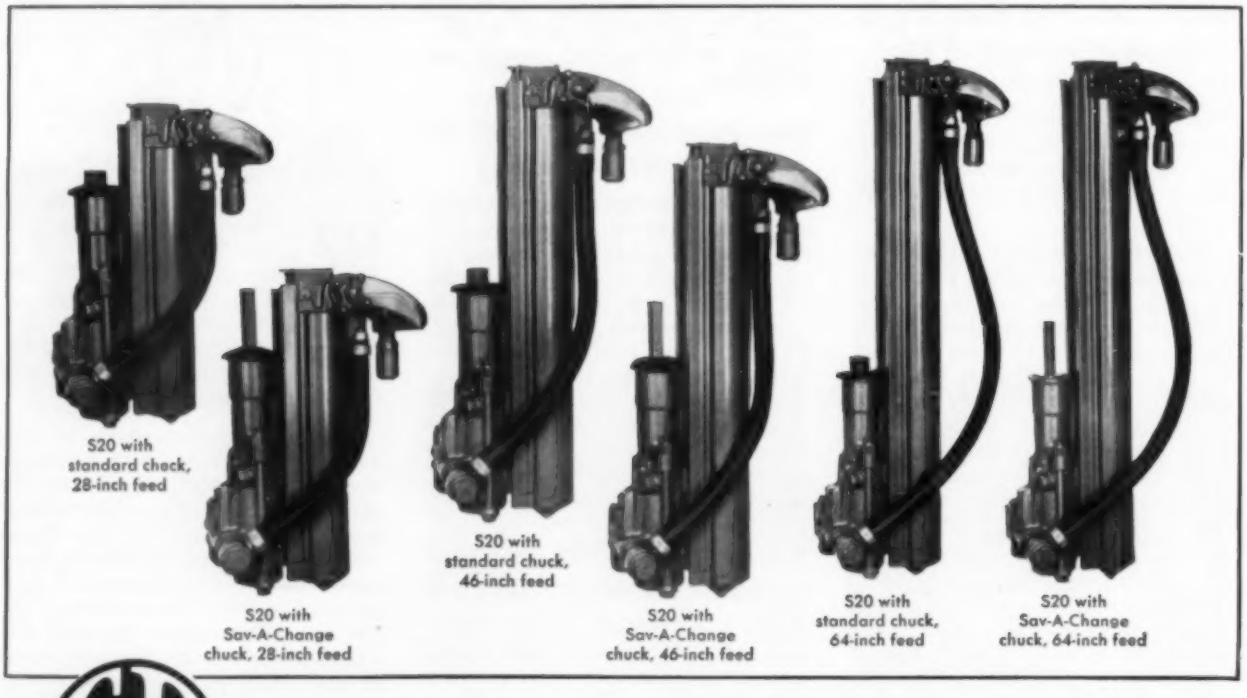
It is the lightest dust-collecting type of stoper available.

It is the only stoper that always starts its feed travel at the bottom of the feed cylinder and continues its feed past the top of the feed cylinder.

It is the only dust-collecting type of stoper that does not remove dust through the body of the machine nor does it use any type of external hood or dust collection tube.

It is the only stoper that is practical in seams down to 26".

From this time on, we feel that the Cleveland Model S20 Vac-Nu-Matic Stoper with its many advantages, will become the *standard of the industry.*


S20 with standard chuck, 28-inch feed
S20 with Sav-A-Change chuck, 28-inch feed
S20 with standard chuck, 46-inch feed
S20 with Sav-A-Change chuck, 46-inch feed
S20 with standard chuck, 64-inch feed
S20 with Sav-A-Change chuck, 64-inch feed

Write or call the Cleveland Rock Drill Division — WABCO for an immediate free demonstration in your own mine.

CLEVELAND ROCK DRILL DIVISION
Westinghouse Air Brake Co.

12500 BEREA ROAD
CLEVELAND 11, OHIO

AMOCO®

promotes the giant-size bite!

It takes carefully controlled power to maneuver the automobile-size bucket of the Page Walking Dragline shown above. To assure lasting, trouble-free operation, special AMOCO products have been designed for this giant-size equipment.

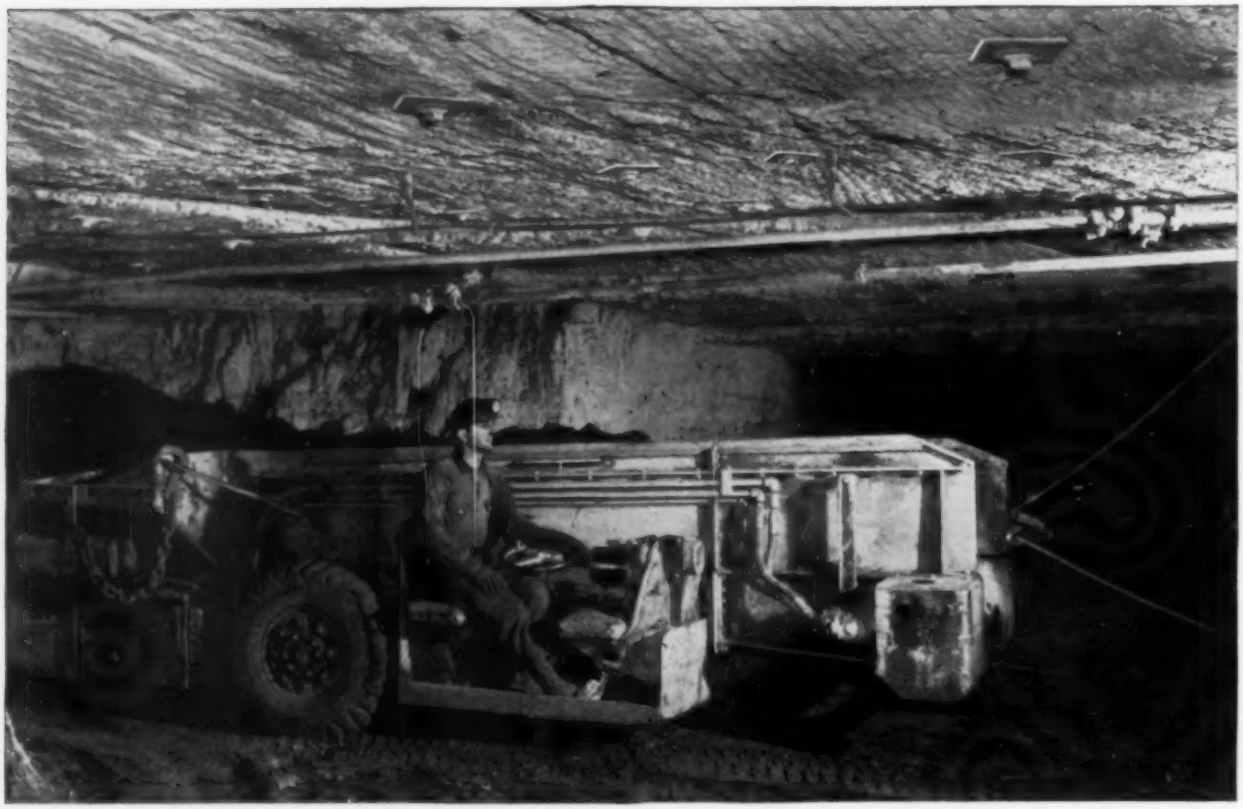
Amoco HDX Oils offer cleaner and more economical lubrication for the Diesel engine, Permalube Gear Oils for enclosed gear cases, and 178 Vesuvius Compound 8X for open gear lubrication. General chassis lubrication is provided by 231-S Permalube Chassis Grease and 158 Permalube All-Purpose Grease.

Consult your nearest Amoco mine lubrication engineer on any equipment maintenance problem—giant-size or ordinary. Branch offices located all over AMOCOal territory.

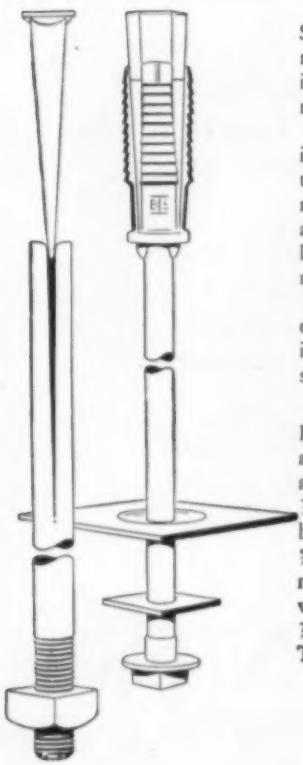
AMOCO LUBRICANTS

FOR MINE MACHINERY

AMERICAN OIL COMPANY ● FROM MAINE TO FLORIDA



You Gain Elbow Room When You Roof-Bolt



Safety is, of course, the No. 1 reason for using mine roof bolts. The bolts consolidate strata into a single-unit thick beam, which effectively minimizes the possibility of serious roof falls.

But roof bolts bring other benefits too—including a big gain in elbow room. When you take out old-fashioned, bulky supports and replace them with modern roof bolts, you automatically gain a lot of extra space. You have larger free areas in which to operate mechanical equipment.

Bethlehem makes four types of roof bolts, each designed to help operators obtain these improved working conditions, and increased safety.

SQUARE-HEAD BOLTS (Three Types)
Bethlehem makes a ¾-in. carbon-type roof bolt, and a ⅞-in. high-strength roof bolt, each with a typical breaking load of 24,000 lb. Also a ⅞-in. high-strength roof bolt with a typical breaking load of 45,000 lb. Both the ¾-in. and ⅞-in. roof bolts can be used with Bethlehem's matching-halves Type F expansion shell, or with the 4-leaf Type C expansion shell. The ⅞-in. roof bolt is intended for use with the Type F shell only, in a 1½-in. hole.

HARDENED WASHERS. Bethlehem makes several sizes of hardened washers for use with headed roof bolts. The washers reduce the friction between the bolt head and roof plate which occurs when high tension in the bolt produces excessive bearing pressure. When this washer is used, there is no danger of galling or tearing of metal with pneumatic impact wrenches.

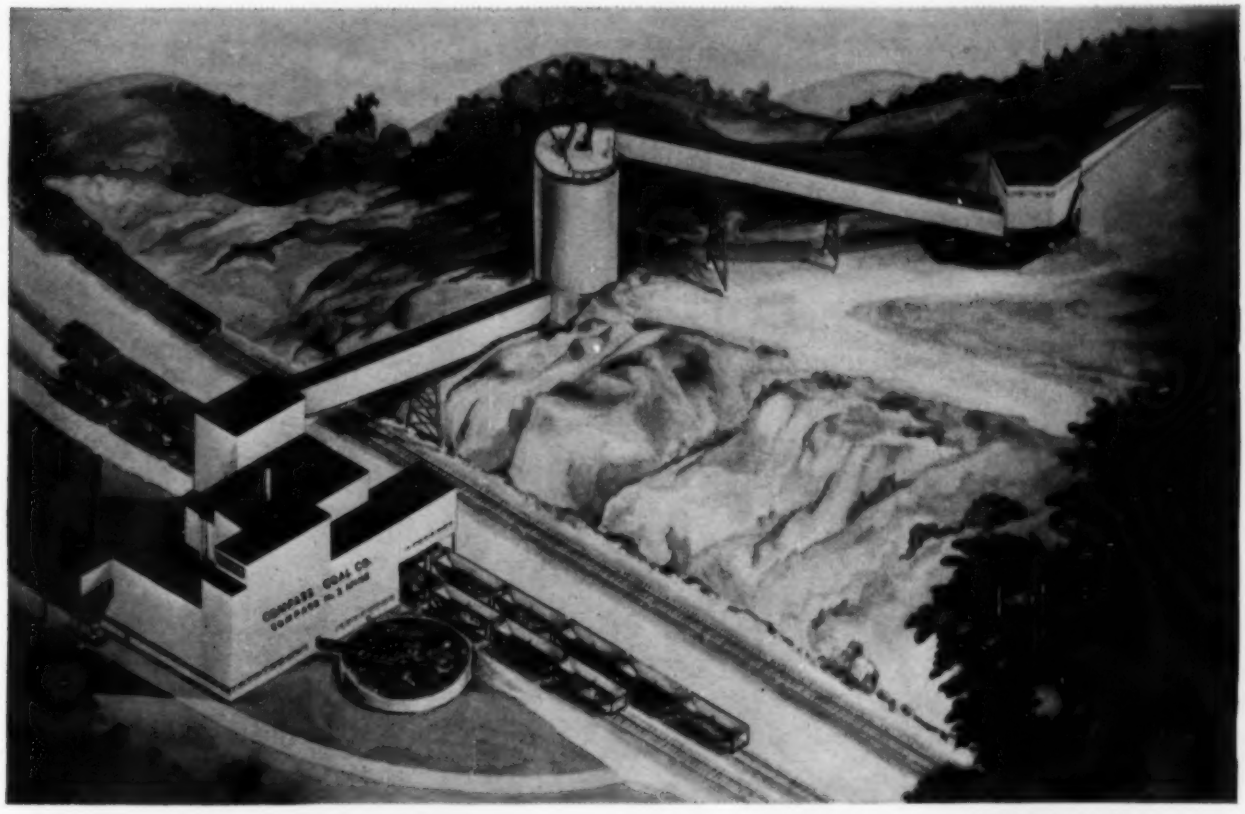
SLOTTED BOLT. This bolt, 1 in. in diameter, has a centered slot which is made by forging. No metal is lost in the forging operation. Opposite end of bolt has 5 in. of rolled threads. Bolt is supplied with steel wedge, which is started in slot when bolt is placed in hole. When bolt is driven in 1¼-in. hole, wedge is forced deep into slot, expanding the bolt-ends. Truncated-cone point prevents damage to threads. Bolt is normally furnished with American Standard Regular Square Nut.

BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. Export Distributor: Bethlehem Steel Export Corporation

BETHLEHEM STEEL

BETHLEHEM STEEL



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. . . the modern approach to coal preparation

In over half a century of continuous operation, Fairmont Machinery Company has kept abreast of the latest developments in coal cleaning and has become nationally known as a leader in the design, fabrication and erection of coal preparation plants.

Fairmont's policy of qualified, coordinated planning has resulted in consistent economy for coal producers throughout the bituminous coal industry.

This coordinated responsibility has provided top separating efficiency through....

1. *Coordinated design, engineering, fabricating and erecting services.*
2. *Independent choice of equipment best adapted to specific requirements.*
3. *Pilot crews provided to instruct permanent crews.*
4. *A well-planned installation that amply meets present needs while providing for the future.*

To upgrade your coal product and guarantee its uniformity... call a Fairmont Engineer! Over 99% separating efficiency through a wide product size range of ⅛ to 10" in any tonnage capacity, is available through Fairmont-Built coal preparation plants.

FAIRMONT MACHINERY COMPANY

FAIRMONT, WEST VIRGINIA

DESIGNERS AND CONSTRUCTORS OF COMPLETE COAL PREPARATION PLANTS USING BOTH WET AND DRY CLEANING, CENTRIFUGAL AND THERMAL DRYING.

A9A HAND-HELD HYDRAULIC DRILL

Here is a light, fast, efficient drill which is proving its worth daily in many mines.

It weighs only 25 lbs. without hoses. The A9A is housed in a strong, light aluminum casting for long-life service. Hoses are light and easy to handle. Hose connections (just two) are on rear of drill housing on centerline with handles, giving good balance for easy operation.

The A9A is fast. As many as fourteen 1 ⅝" diameter holes, 9 feet deep, have been drilled in a five minute period. Amount of pressure applied to conveniently located operating lever along side of one handle regulates variable auger speed. Valve design returns A9A to free flow instantly when handle is released, stopping drill.

The A9A has an axial piston type hydraulic motor, chosen because of its superior efficiency. Drill can be adapted to most cutters, loaders, roof drills etc. having a suitable hydraulic system by adding hydraulic power take-off. The A9A will operate satisfactorily with pressures of 900 to 2000 PSI with 12 to 20 gallons of oil per minute, and with a minimum oil tank capacity of 20 gallons.

Write to Mining Sales Division, The Jeffrey Manufacturing Company, Columbus 16, Ohio for Leaflet 893.

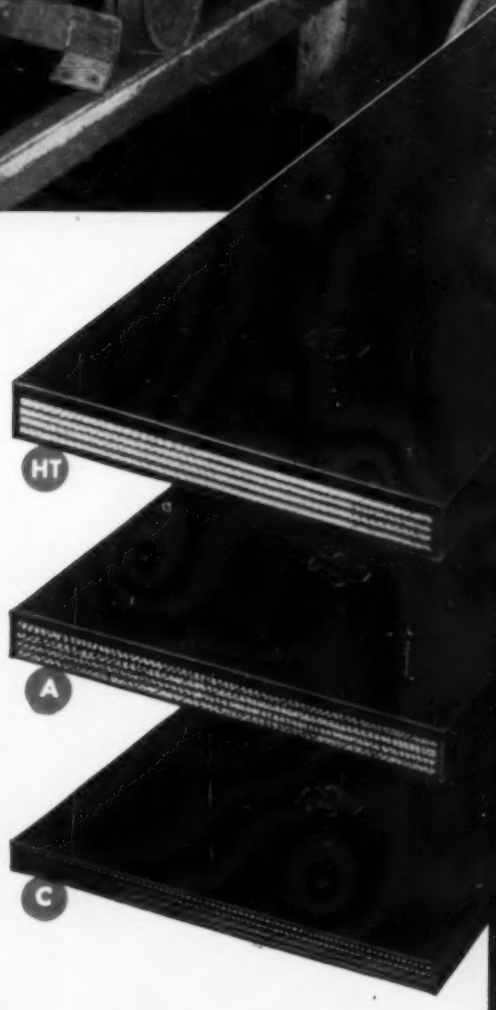
JEFFREY

MINING • CONVEYING • PROCESSING EQUIPMENT
TRANSMISSION MACHINERY • CONTRACT MANUFACTURING

Thermoid Conveyor Belting cuts handling costs on rugged mining jobs

There's a Thermoid Conveyor Belt designed to lower your handling costs on every mining job. Here are three examples: HT —For extremely abrasive materials such as coal, granite, trap rock, flint rock, quartz ore; A —For slag, lime rock, crushed stone and other highly abrasive materials; C —For moderate abrasives such as sand, loam, soda, gravel.

Thermoid's exclusive impregnation process welds carcass and cover into an exceptionally strong, durable belt. Finest quality reinforcement and specially compounded rubber stocks assure long life . . . lower your handling costs per ton. Your Thermoid Distributor carries a complete line of Thermoid Conveyor Belting, Multi-V Belts and Hose to meet the most severe requirements of any mining operation. Call him or write direct for full information.



Conveyor & Elevator Belting • Transmission Belting
F.H.P. & Multiple V-Belts • Wrapped & Molded Hose

Thermoid

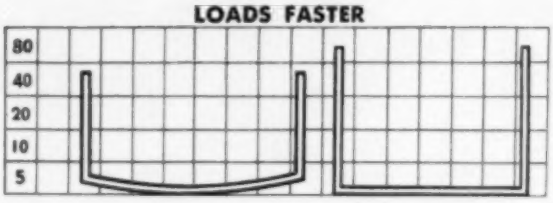
Rubber Sheet Packings • Molded Products
Industrial Brake Linings and Friction Materials

Thermoid Company • Offices & Factories: Trenton, N. J., Nephi, Utah

Compare these dirt-moving features before you buy

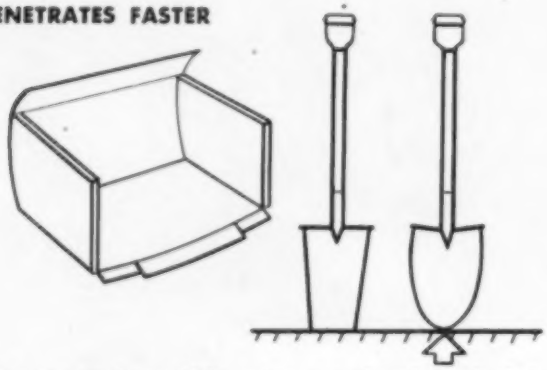
Check over these Allis-Chalmers TS-200 Motor Scraper features point by point. See for yourself how performance makes dollars when design makes sense.

LOADS FASTER



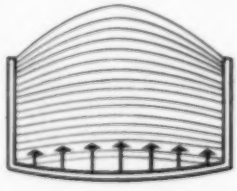
Tests have proved that loading resistance is largely determined by the height to which the load is built. That's why the lower, wider bowl of an Allis-Chalmers Motor Scraper requires less time and power to get the same yardage.

PENETRATES FASTER



The penetrating ability of a round-end spade helps illustrate how the curved and offset cutting edge on Allis-Chalmers Motor Scrapers concentrates all the horsepower on the center section during initial penetration.

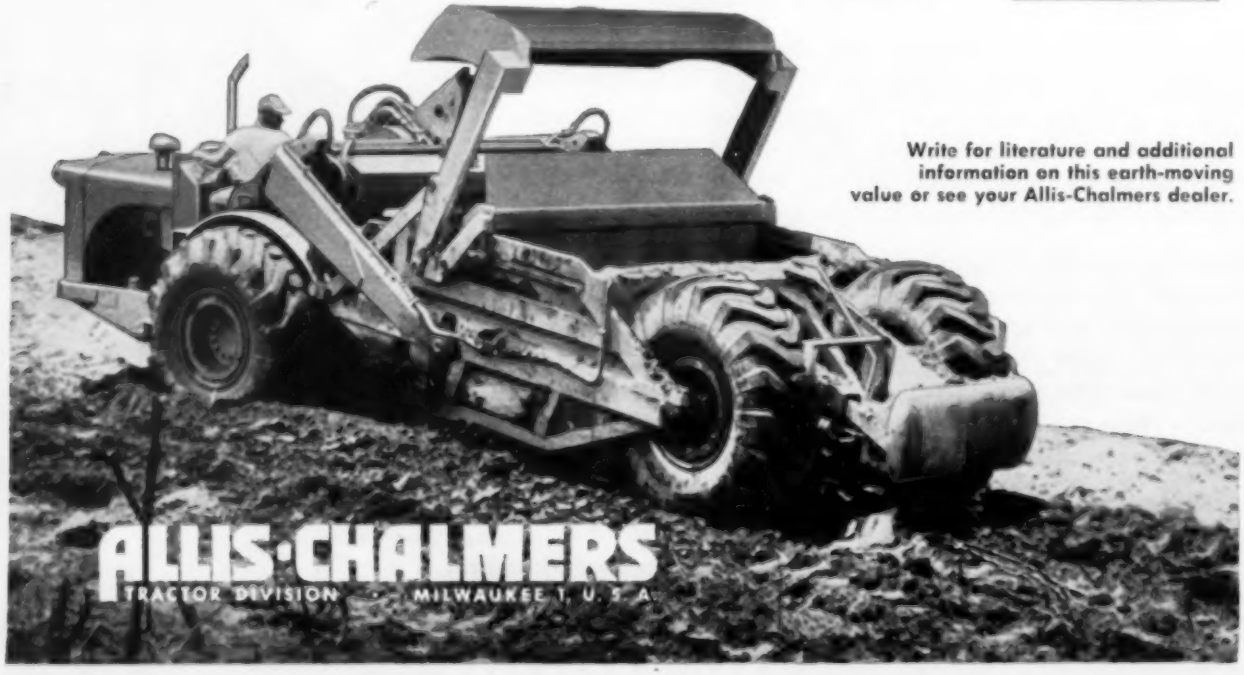
HEAPS AUTOMATICALLY



The combination of slightly deeper center cut and correctly angled cutting edge shapes the load as the scraper fills. The greater volume of dirt flowing into the center of the bowl "boils" forward, to the rear and to the sides, producing an automatically heaped load without excessive spillage.

SPREADS EVENLY

Forward movement of ejector is timed with lifting action of apron, which provides a continuous flow of material to insure a smooth, even spread. High apron lift prevents any possibility of material's jamming.



Write for literature and additional information on this earth-moving value or see your Allis-Chalmers dealer.

Now you can drill 6¾ to 9-in. blast holes

fast and economically—

BUCYRUS ERIE

40-R ROTARY

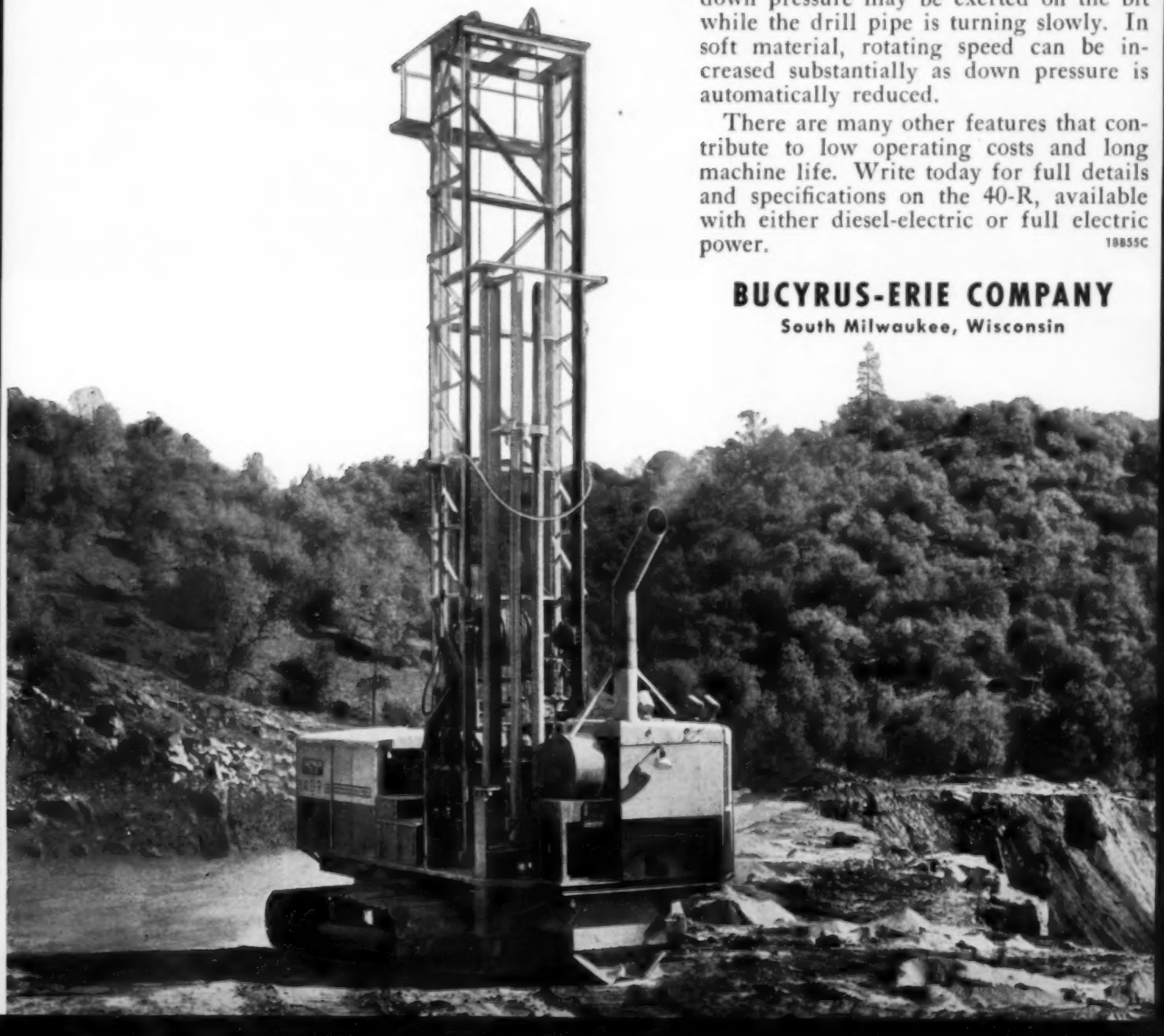
The new 40-R is another significant Bucyrus-Erie advance in rotary blast hole drills. Flexible and powerful, it puts down medium-large holes quickly and efficiently in both hard and soft formations.

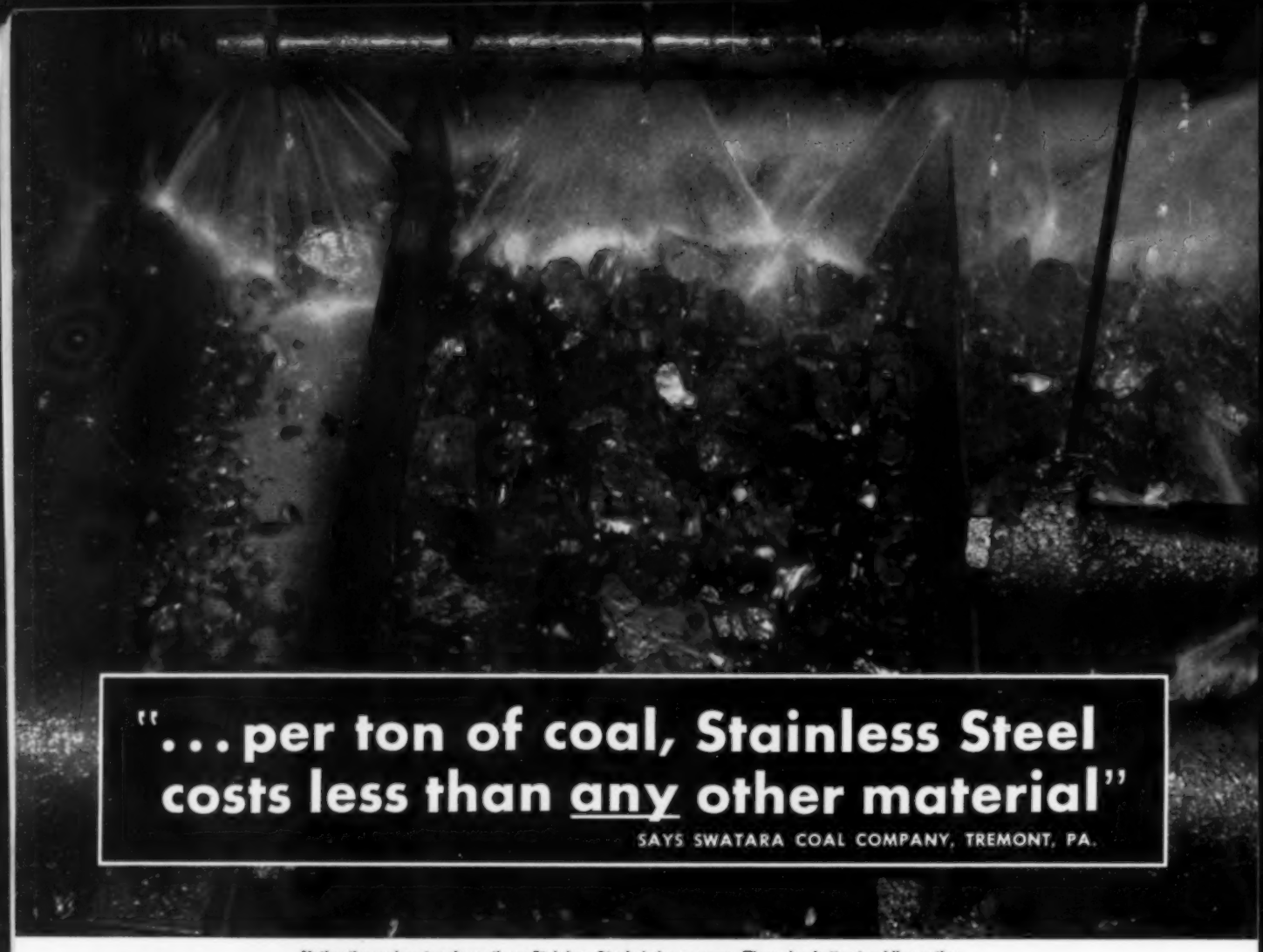
Continuous progress in any material is assured by this exclusive combination of features: *variable drilling speed* through Ward Leonard electric control and *variable down pressure* through hydraulic motor control.

The Ward Leonard variable-voltage system gives the operator smooth, instant command over rotation of the drill pipe. He can choose the most efficient speed for a given formation — can vary the speed as required without stopping the drilling operation. In hard formations maximum down pressure may be exerted on the bit while the drill pipe is turning slowly. In soft material, rotating speed can be increased substantially as down pressure is automatically reduced.

There are many other features that contribute to low operating costs and long machine life. Write today for full details and specifications on the 40-R, available with either diesel-electric or full electric power. 18855C

BUCYRUS-ERIE COMPANY
South Milwaukee, Wisconsin





"...per ton of coal, Stainless Steel costs less than any other material"

SAYS SWATARA COAL COMPANY, TREMONT, PA.

Notice the perizer treads on these Stainless Steel shaker screens. They give better tumbling action.

Close-up of above picture. No screen has ever cracked.

Stainless Steel screens last about 18 months in this vibrator, equivalent to 170,000 tons of coal.

The Swatara Coal Company produces about 2500 tons of anthracite a week. The fine media coal separator consists of a 5 x 16-foot vibrating shaker, dewatering troughs and media cleaning machines. Each device is a showplace for abrasion-resistant Stainless Steel. Sizes of coal cleaned range from egg to #1 buck in the media process.

The impact segment of the shaker (where the coal is dropped) lasts a full 6 months. The other 3 segments have been in service 18 months, and are still in good condition. Each segment is made from 14-gauge Stainless Steel.

Average screen life in the dewatering trough is about 18 months; but some screens have been in service since the plant was opened in 1947 and they're *still* going strong!

In the cleaning machines, the Stainless Steel flumes have shown an average service life of 15 months—processing about 250,000 tons of coal and waste before replacement.

Stainless Steel has completely solved the rust and blinding problems, according to management. But more important, " . . . per ton of coal, Stainless Steel costs less than *any* other material."

Do these results look good to you? Then specify service-tested USS Stainless Steel.

SEE "THE UNITED STATES STEEL HOUR"—Televised alternate weeks—
Consult your newspaper for time and station.

UNITED STATES STEEL CORPORATION, PITTSBURGH • AMERICAN STEEL & WIRE DIVISION, CLEVELAND
COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO • NATIONAL TUBE DIVISION, PITTSBURGH
TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA.
UNITED STATES STEEL SUPPLY DIVISION, WAREHOUSE DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

USS

USS STAINLESS STEEL

SHEETS · STRIP · PLATES · BARS · BILLETS · PIPE · TUBES · WIRE · SPECIAL SECTIONS

5-1028

UNITED STATES STEEL

GM DIESEL
CASE HISTORY No. 1A3-16

OWNER: Crowe Coal Company, Kansas City, Mo.

INSTALLATION: Six GM Diesel-powered Dart trucks . . . three 20-ton rear-dumps and three 40-ton bottom-dumps. GM Diesel-powered Bucyrus-Erie #38-B shovel with 2¼-yard bucket. The company also operates three 20-ton bottom-dumps powered with 4-cycle Diesels.

PERFORMANCE: GM Diesel-powered trucks have faster pickup, respond to throttle controls better, use less lube oil. Engines take less time—cost less to overhaul. Shovel strips 1000-1200 tons of coal in 7¼ hours—burns 4 gallons of fuel per hour.

Quicker Pickup-Faster Hauling

MISSOURI's Crowe Coal Company operates nine trucks—six powered by General Motors 2-cycle Diesels and three with 4-cycle Diesels. They report the GM Diesel-powered trucks "respond quicker, use less lube oil, are easy to overhaul."

A General Motors Diesel does "respond quicker." It gets more work done than most engines, partially because of its 2-cycle "power on every piston downstroke" design. It costs less to buy. It costs less to maintain because GM Diesel replacement parts cost less (valves up to 62% less and cylinder liners up to 40% less) than parts for comparable Diesels.

Today you can get GM Diesel power in more than 750 different models of equipment built by over 150 manufacturers. Call in your local GM Diesel distributor or write direct for more information.

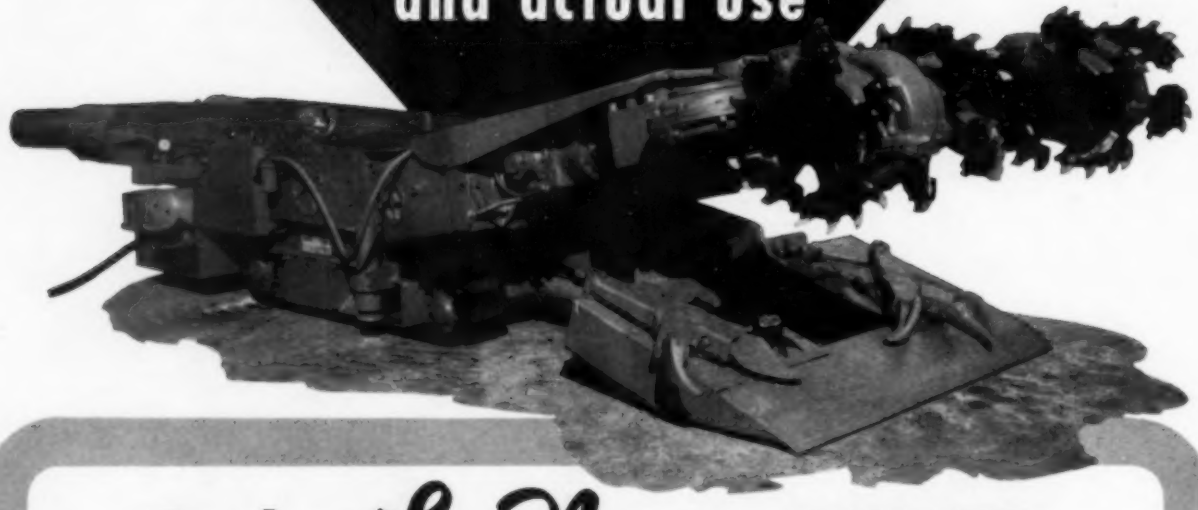
It Pays to Standardize on

GM
GENERAL MOTORS
DIESEL POWER

DETROIT DIESEL ENGINE DIVISION
GENERAL MOTORS • DETROIT 28, MICHIGAN
Single Engines . . . 30 to 300 H. P. **Multiple Units . . . Up to 893 H. P.**

Lee-Norse MINER

Tried and proved by years of development and actual use



Only Lee-Norse MINER

1. Provides practical pattern cutting.
2. Uses a simplified rotary cutter.
3. Cuts its way steadily forward into the face without swinging the cutter head.
4. Has a gathering head that performs maximum cleanup — no auxiliary loading equipment necessary.
5. Produces coarse cuttings from diamond-like projections—fines are held to a low minimum.
6. Requires no additional or elaborate power facilities.
7. Combines the best features of modern loading machine designs with the unique principle of "pattern cutting".
8. Is produced by an organization with an enviable record of outstanding achievement in the field of mining equipment design and production.

Write today for literature:

Lee-Norse Company

Specialists in Coal Mining Equipment

CHARLEROI, PA.

Sharp Teeth
That Stay
Sharp
MEANS . . .

More Production At Lower Cost

H&L *Teeth*
A tried and proven Product

H&L TOOTH COMPANY
(Pioneer Manufacturers of Two-Part Teeth)
1540 SOUTH GREENWOOD AVENUE
MONTEBELLO CALIFORNIA

Dealers located in strategic points to insure prompt service

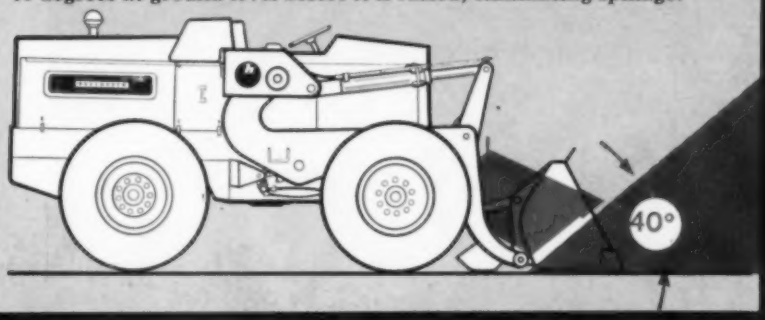
only these **2** completely different

PAYLOADER® TRACTOR-SHOVELS

offer you all these features...

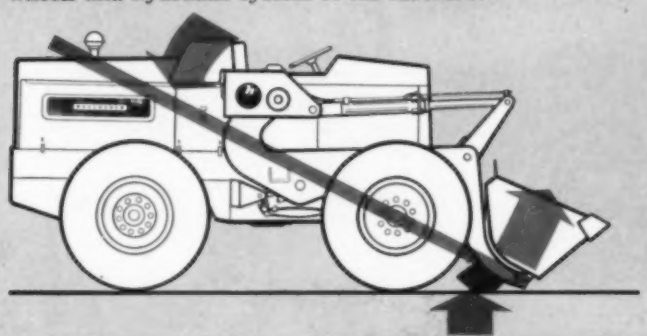
40 DEGREES BREAKOUT AT GROUND LEVEL

You can get HEAPED BUCKET LOADS and you get them FASTER and EASIER WITH THIS NEW BUCKET ACTION. Most important of all—you KEEP BIGGER PAYLOADS—because the bucket can be tipped back a full 40 degrees at ground level before it is raised, eliminating spillage.



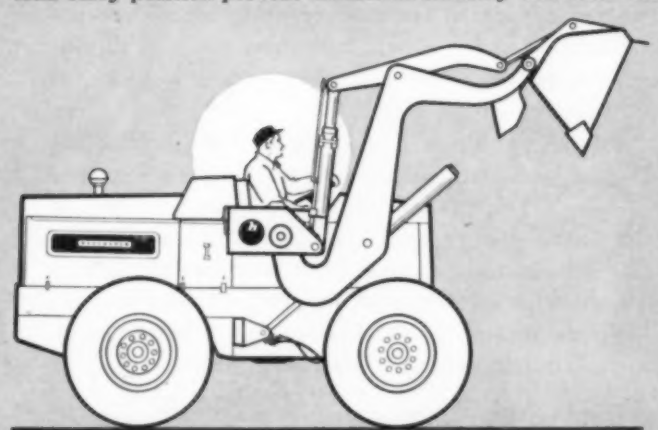
POWERFUL PRY-OUT ACTION

Tremendous pry-out force is obtained by using the breakout pads on the ground as a fulcrum for leverage. The load forces opposing the pry-out action are thus transferred to the ground through the pads instead of to the axle, wheels and hydraulic system of the machine.



SAFETY AND STABILITY

Underslung boom-arm design keeps moving members out of operator's reach at all positions—without using safety guards and screens. Longer wheel base and close, low, load-carry position provide maximum stability and balance.



PAYLOADER®

MANUFACTURED BY
THE FRANK G. HOUGH CO. · LIBERTYVILLE, ILL.
SUBSIDIARY—INTERNATIONAL HARVESTER COMPANY

HOUGH-DESIGN
HOUGH-QUALITY
HOUGH-PERFORMANCE

more horsepower

per bucket capacity than any other wheel tractor-shovel. Either gasoline or diesel power available.

easy to operate

Fullest operator visibility for safe, fast maneuvering; power-steering; minimum number of control levers. Foam-rubber molded seat and back cushions. Seat adjustable for operator comfort. Longer wheelbase and better balance add to riding comfort.

accessibility

Unusual accessibility for servicing and maintenance. Battery and oil reservoir are located under an easy-access cover just behind driver's seat. Sealed grease fittings. Exterior hydraulic line outlet provided for easy addition of hydraulically-operated accessories.

torque-converter drive

in conjunction with 4-speed, full-reversing transmission provides precise, easy control and the widest possible range of speeds for both forward and reverse. Acts as a shock-absorber for the entire power train.

other features

Closed, pressurized hydraulic system to keep dirt and air out of oil; powerful hydraulic brakes; double-acting hydraulic cylinders and chrome-plated piston rods; 12-volt electric systems on gas-powered models; forward and backup driving lights; tail lights.

THE FRANK G. HOUGH CO.
[illegible]

Send me full information on the new model HH and HU "PAYLOADER" tractor-shovels
☐ Model HU–1 cu. yd. ☐ Model HH–1½ cu. yd.

Name.....

Title.....

Company.....

Street.....

City.....

State.....

Now—a roof support that gives instead of collapsing

Here is a truly major development in mine-roof control — a real step upward in safety and downward in maintenance costs. It's the Bethlehem Yieldable Arch, so called because its design permits the arch to yield, rather than bend or buckle, under excessive underground pressures.

The Yieldable Arch is made up of U-shaped segments heavily flanged to resist collapse and torsional stresses. Segments are joined by means of U-bolt clamps, creating friction joints which slide or yield under heavy pressures.

The yielding of the roof support permits the natural relaxation and stabilization of the surrounding strata. At the same time, the increased overlapping of the segments strengthens the arch and adds to safety in the mine.

Individual arches are tied together by horizontal struts which are clamped to the arch with special J-bolts. The struts help the arches to reinforce each other, and transmit lateral forces from one arch to the other. Bethlehem can also furnish steel lagging with the arches, if desired.

The Yieldable Arch is quick and easy to install, promises a very long life and high recovery value. It should pay for itself in its first year. A Bethlehem engineer is ready to discuss the full story with you. It's worth hearing. Just get in touch with the nearest Bethlehem office.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

BETHLEHEM STEEL

BETHLEHEM YIELDABLE MINE ARCH

SUBSIDIARY—INTERNATIONAL HARVESTER COMPANY

Where there is mechanized coal mining...

FIRTHITE "Blue Bits" ARE STOCKED

In all the major coal producing areas of the country Firthite famous "Blue Bit" mining tools are available from stock from Firth Sterling distributors. More than just "availability," however, recommends them to your use.

Firthite Quality Carbides

Firthite mining inserts have been metallurgically engineered to withstand the severe shocks and abrasion of drilling in all types of formations, and tip designs assure free cutting and low power consumption.

Premium Alloy Shanks

A carbide tool is no better than its shank! "Blue Bit" shanks are drop forged from premium alloy steels, machined to uniform dimensions and skillfully heat treated to the proper degree of hardness and toughness to withstand the high torques and pressures encountered in mining uses.

Controlled Quality

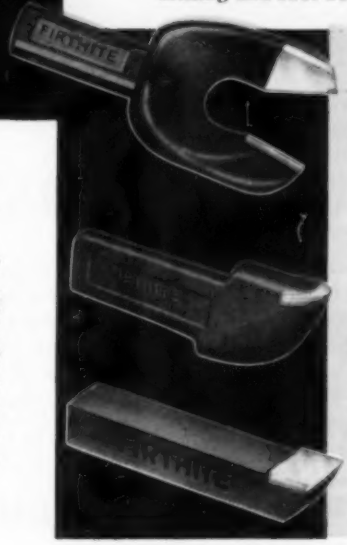
Shanks and tips are bonded together with premium quality silver alloy, resulting in what field tests have shown to be the strongest braze in any carbide mining tool—all carefully *controlled* by frequent Izod impact testing to a measured impact and statistically checked.

Engineering Service

Too, there's a Firthite Engineer located in your coal producing area, always ready to become familiar with your operations and to assist in solving your cutting, drilling and roof bolting problems.

ROOF BITS

Firthite "Blue Bits" for roof drilling are made in 3 styles: RD-L for light uses and very soft roof rocks; RD-H with extra heavy duty insert to resist gage wear for most difficult roof drilling; RDS (slotted) for faster drilling of medium to hard roofs. All are water channeled for either wet or dry work.



DRILL BITS

Firthite "Blue Bits" for rotary drilling available in 3 styles:—D with either square or hex shank for use with any standard drilling equipment; DV (illustrated) for faster and easier hand held drilling.

MACHINE BITS

Firthite "Blue Bits" for mining machines encompass a line including a bit design, style and grade for every need. C-4-H (illustrated) is one of several designed for use in non-pure veins where the going is tough and on continuous miners.

FINGER BITS

Firthite "Blue Bits" for use in standard drill heads feature two-surface brazing with tips set in recesses for greater strength. Available in all popular sizes.

Mr. Tooley says—

Because Firth Sterling makes both steels and carbides, "Blue Bit" mining tools are as perfect as integrated production and engineering can make them. Both the carbide inserts and the alloy tool steel shanks are produced under controlled conditions by one company for maximum quality and operating effectiveness!

R-302

Firth Sterling

—INC—

GENERAL OFFICES: 3113 FORBES ST., PITTSBURGH 30, PA.

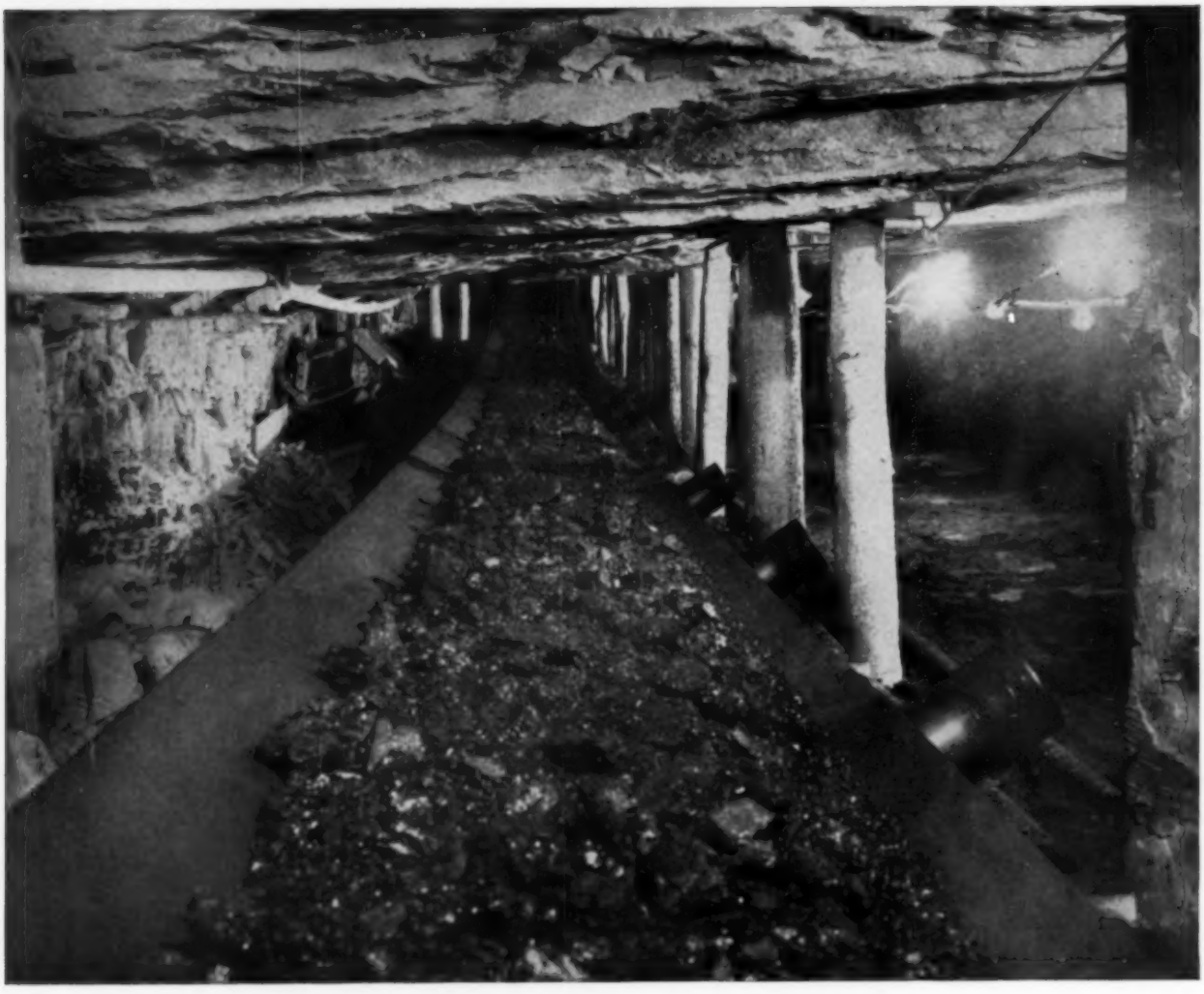
OFFICES AND WAREHOUSES*: BIRMINGHAM CHICAGO* CLEVELAND DAYTON DETROIT* HARTFORD* HOUSTON LOS ANGELES* NEW YORK PHILADELPHIA PITTSBURGH WASHINGTON WESTFIELD, N.J.

PRODUCTS OF FIRTH STERLING METALLURGY

High Speed Steels — Sintered Tungsten Carbides
Tool & Die Steels — Firth Heavy Metal
Stainless Specialties — Chromium Carbides
High Temperature Alloys — High Temperature Cermets
Zirconium

FIRTH STERLING TRADE MARK

Barnes and Tucker Co. reports: **"Almost 10 miles of belting reinforced with Du Pont 'Cordura' helped increase production, cut expenses"**



NOW Du Pont "SUPER CORDURA" makes belts even stronger

Eight separate belting operations—nearly 10 miles of belts—are used by the Barnes and Tucker Co. of Pennsylvania in mining 4,000 tons of bituminous coal daily. And all of this belting is built with Du Pont "Cordura"* High Tenacity Rayon, for extra strength, less stretch, better troughing and training.

The company reports that the belts reinforced with "Cordura" have been an important factor in raising production from 2,500 to 4,000 tons daily. Manufactured by the Boston Woven Hose and Rubber Co., the belts currently operate 14 hours each working day. Performance has been outstanding, with little maintenance necessary. What's more, the use of conveyor belts saves the expense of cutting higher openings to lay track and run coal cars to the digging area. And the low stretch of Du Pont "Cordura" reduces expensive downtime for take-up and repair.

And now—there's an even stronger, tougher reinforcement available for conveyor belting—Du Pont "Super Cordura"* High Tenacity Rayon. A product of Du Pont research, this exceptionally strong rayon offers top performance under the most rugged conditions of use. Write us for the names of suppliers. E. I. du Pont de Nemours & Co. (Inc.), Textile Fibers Dept., Wilmington 98, Del.

*REG. U. S. PAT. OFF.

DU PONT *Super Cordura*
High Tenacity Rayon

DU PONT
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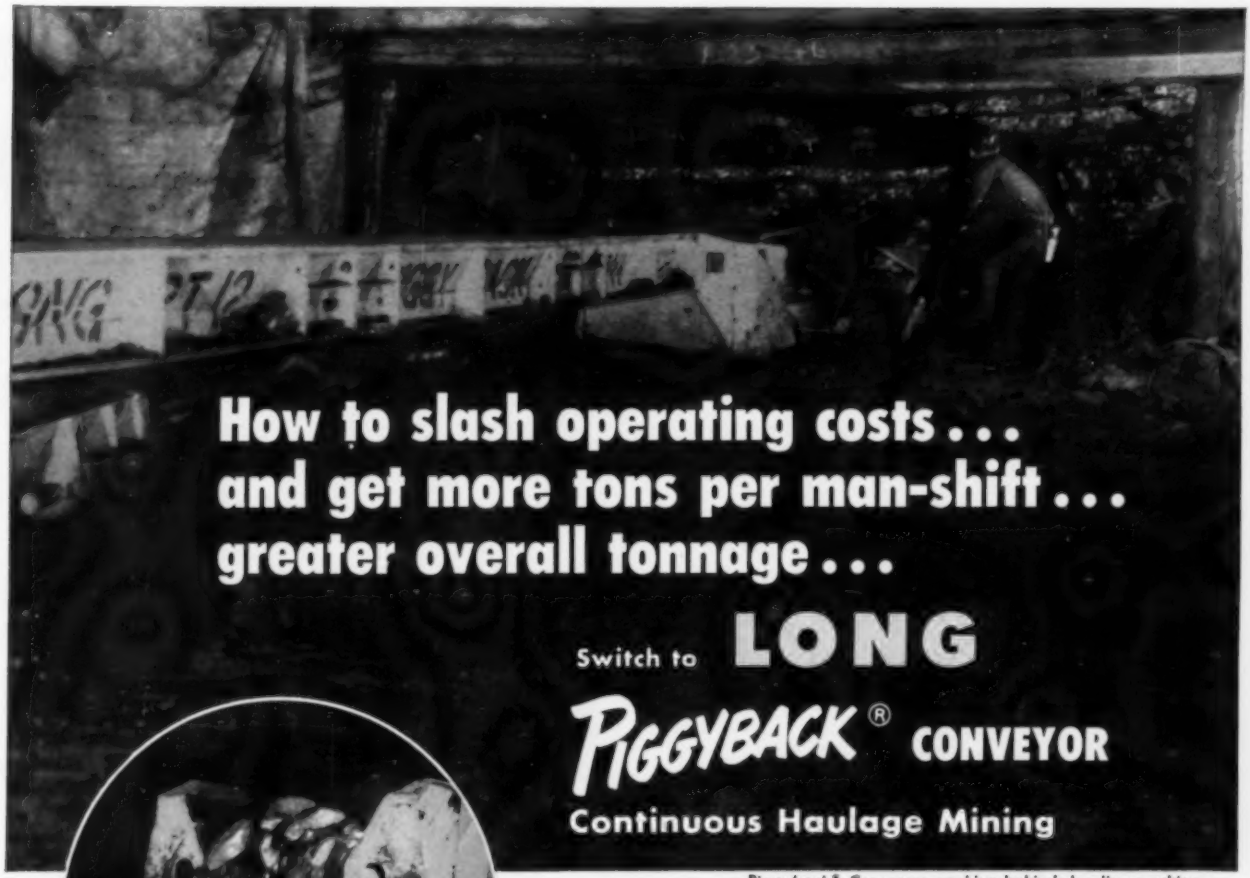
BETTER THINGS FOR BETTER LIVING . . . *THROUGH CHEMISTRY*



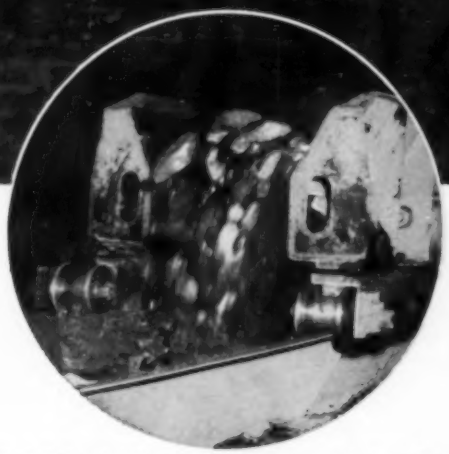
How to slash operating costs . . . and get more tons per man-shift . . . greater overall tonnage . . .

Switch to **LONG**

PIGGYBACK® CONVEYOR

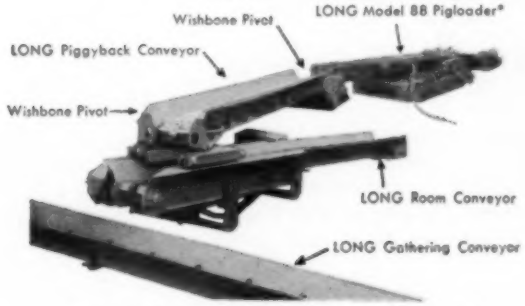
Continuous Haulage Mining

Piggyback* Conveyor working behind loading machine.



Coal discharging from Piggyback Conveyor to Long Room Conveyor. Note how Piggyback rides on top of pan line.

Units of the Piggyback Conveyor System



The receiving end of the Piggyback Conveyor is attached to the Pigloader Loading Machine and follows it as it moves. Thus, the operator can devote his full attention to loading. Wishbone pivots make possible continuous haulage at 90° angle breakthroughs and dolly action permits long advances without pan-ups.

The Piggyback Conveyor system provides uninterrupted haulage from the face . . . eliminates costly loading delays common with "stop-and-go" transportation of other systems.

Every day more and more companies are learning that Piggyback Conveyor mining pays off in greatly increased production at greatly reduced operating costs. In fact, at many mines, this unique system has meant the difference between operating at a profit instead of a loss.

With proved, practical Piggyback Conveyor mining, six hours or more loading time per shift is not unusual. Coal is loaded and moved out in a steady, continuous flow—with no down-time waiting for intermittent transportation. The result: more tons per man—higher total tonnages per section. What's more, capital investment per ton for installing the Piggyback Conveyor system is much lower than for any other continuous mining method.

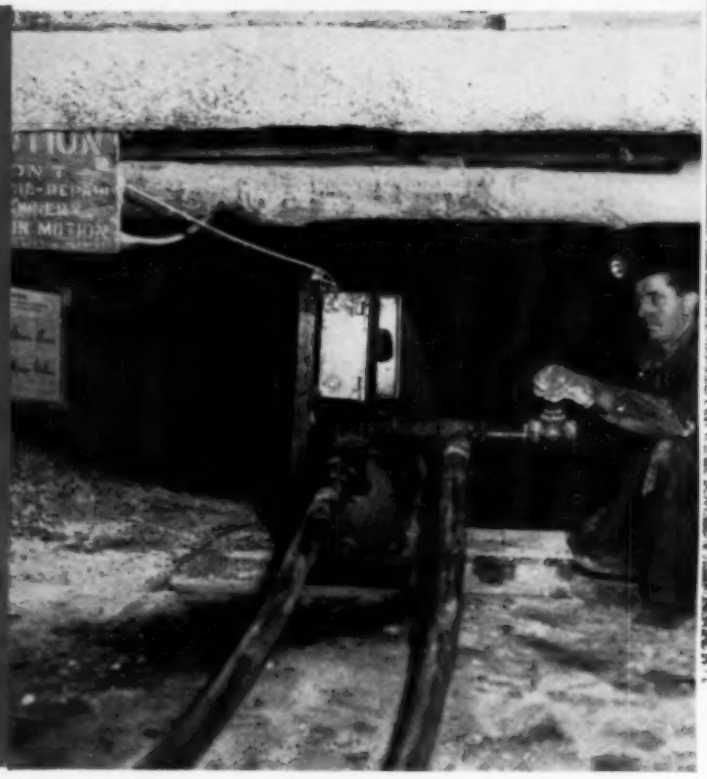
There are, of course, other reasons why low-maintenance Piggyback Conveyor mining is unequalled in efficiency and economy. We'll be glad to give you complete information, without obligation.

*Trade Mark

For complete details or a demonstration, write us today!

The **LONG** Company
OAK HILL, W. VA.

"Plastic Pipe is undamaged by acid water after 4 years of constant use"



"High corrosion-resistance has eliminated replacement cost to date."

"In my opinion, plastic pipe is the only pipe to use where there's considerable acid in mine water." So reports an enthusiastic coal mine operator* after installing plastic pipe throughout his drainage system.

The reason is simple. Tough, durable Republic Flexible Plastic Pipe is made from chemically inert polyethylene, an amazing plastic which is highly resistant to acids, alkalies, metallic salts or other corrosive wastes. Furthermore, it's immune to electrolytic action.

"Ease of handling and joining helped lower installation costs, too."

"Extreme flexibility made it a cinch to lay, particularly around corners or in barren areas where many falls of rock were encountered."

And joining is easy, too. The only tools needed are an ordinary handsaw or hacksaw plus a screwdriver for tightening the stainless steel clamps. Said this same operator, "In one of our mines, *two men installed 1000 feet of 2-inch plastic pipe in 2 hours!*"

"Lightweight and long lengths make it ideal for low-coal mining."

"In another mine, where the coal seam was only 30″, it would have been almost impossible to take care of our drainage problems without plastic pipe." Its lightness enables one man to handle a 300-foot coil, drag it over and around obstructions with ease.

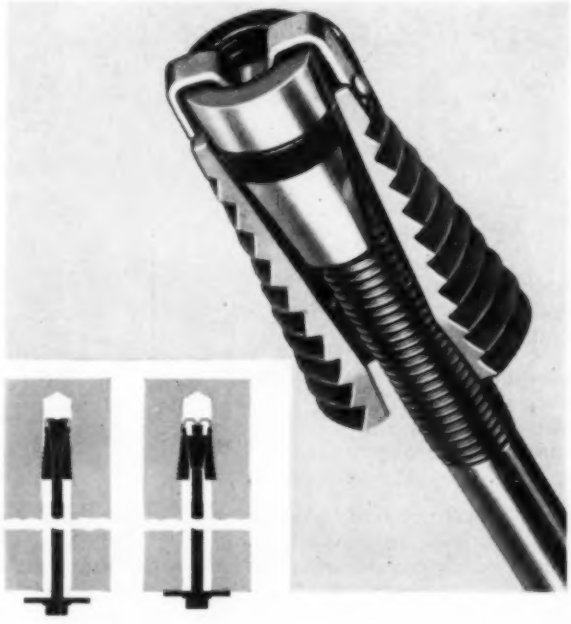
Republic Flexible Plastic Pipe is made in 9 sizes from ½″ to 6″ diameters. Coil sizes—½″ through 3″; straight lengths—4″ and 6″. A complete line of special fittings for every requirement is available. Inquire from your local Republic jobber. For illustrated booklet telling complete facts, mail coupon today.

*name on request

REPUBLIC STEEL

World's Widest Range of Standard Steels and Steel Products

REPUBLIC PLAYS AN IMPORTANT ROLE IN THE COAL INDUSTRY



HERE'S REPUBLIC'S NEWEST MINE ROOF BOLT assembly with a forged steel wedge nut and shell. It retains proved qualities of the wedge head assembly, permits recovery of the bolt, and eliminates protruding threads below the bearing plate, often a hazard in low-ceiling areas. It installs easily in the oversize or irregular holes which so often result when drilling soft strata. Designed for use with ¾″ or ⅝″ bolts, furnished in either high- or low-carbon analyses. Both size bolts have square heads, washer forged under head and are unchamfered for snug wrenching. Send coupon for new booklet on the complete line of Republic Mine Roof Bolts.

LIGHTWEIGHT MINE CARS OF GREAT STRENGTH are constructed from Republic High Strength Steels. These cars and other mobile equipment are designed and engineered to take full advantage of the weight-saving qualities (as much as 50%) of High Strength Steels. A combination of strength, toughness and corrosion-resistance means longer life where the going is rough.

REPUBLIC STEEL CORPORATION
3124 East 45th Street
Cleveland 27, Ohio

REPUBLIC STEEL

Please send me additional information on:

☐ Plastic Pipe ☐ High Strength Steels
☐ Mine Roof Bolts

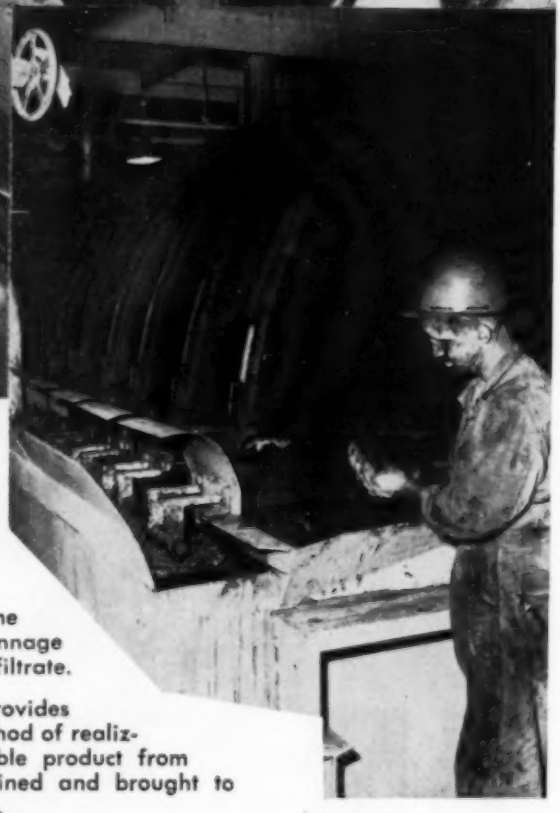
Name_____ Title_____

Company_____

Address_____

City_____ Zone_____ State_____

E-4640

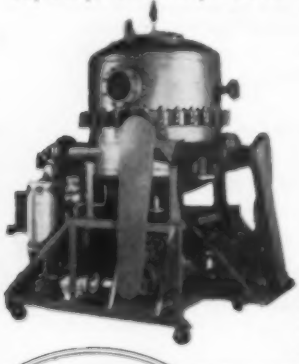


Smooth-Evenly Dried Coal Fines

Eimco Agidisc Filters are heavy duty continuous vacuum filters particularly suited to dewatering of fine coal.

The advantages of Eimco Filters in the dewatering of fine coals are in its completely automatic operation, high tonnage capacity, even dryness of the dewatered cake and a clear filtrate.

The use of Eimco Filters provides the most economical method of realizing maximum salable product from the tonnage mined and brought to the surface.



Let us tell you what Eimco Continuous Pressure Filters can do for you in coal tars and coal derivatives.

Eimco's Research and Development Center in Palatine, Illinois, has run exhaustive research studies on dewatering of fine coals. This data has been presented at numerous technical meetings in the States and Abroad. The findings of these studies are available to you — write for complete information.

THE EIMCO CORPORATION

Salt Lake City, Utah—U.S.A. • Export Offices: Eimco Bldg., 52 South St., New York City

New York, N. Y. Chicago, Ill. San Francisco, Calif. El Paso, Texas Birmingham, Ala. Duluth, Minn. Kellogg, Ida. Baltimore, Md. Pittsburgh, Pa. Pasadena, Calif. Houston, Texas London, England Gateshead, England Paris, France Milan, Italy Johannesburg, South Africa

B-118

complete line of HEAVY-DUTY cords helps you

PICK THE RIGHT CORD FOR YOUR JOB!

Now—Anaconda introduces new portable cords with rugged construction . . . peak performance . . . and top flexibility for 3 types of service!

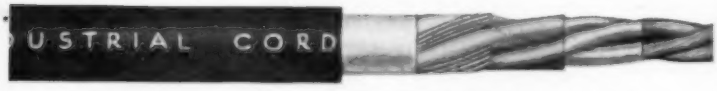
Severe applications . . . Hard usage . . . Standard service — Anaconda brings you 3 new engineered cords designed with the exact physical properties needed for each type of job—strength, flexibility and resistance to wear!

Select the cord *best suited* to your needs—based on good engineering and sound economics.

Whichever cord you choose, the Anaconda trademark is your assurance of *premium performance.*

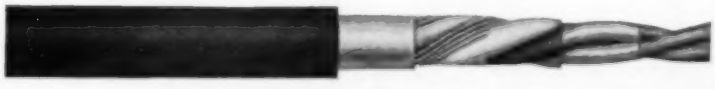
SECURITYFLEX—Underwriters' approved Types SO and SJO.

SECURITYFLEX* CORDS for severest conditions. Toughest, sturdiest cords made . . . used where strength and wear-resistance are a "must." Neoprene jacket *mold-cured in lead* gives top crush, abrasion- and oil-resistance. Cords pay for themselves with long life under severest conditions—in mines, railroads, docks, and in heavy industrial use. Look for the molded-in name, "Securityflex!"



INDUSTRIAL—Underwriters' approved Types SO and SJO.

INDUSTRIAL CORDS for heavy industrial conditions and *maximum flexibility.* Lower in cost. Specially designed for use in heavy industry—where cords are in continuous operation and must be tough, flexible, oil-resistant. Tough neoprene jacket. Many industrials stock this one cord for use in virtually all applications . . . reducing inventory problems and costs. Look for the Anaconda marking on jacket.



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SERVICE CORDS for regular duty. Lowest in cost . . . yet have many features found only in higher priced cords of other makes. Special rubber jacket withstands abuse and moisture. Outstanding for appliances, office machines, portable tools—where flexibility and long life are needed.

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Gentlemen: Please send me your new free "Portable Cords" bulletin, DM-5538.

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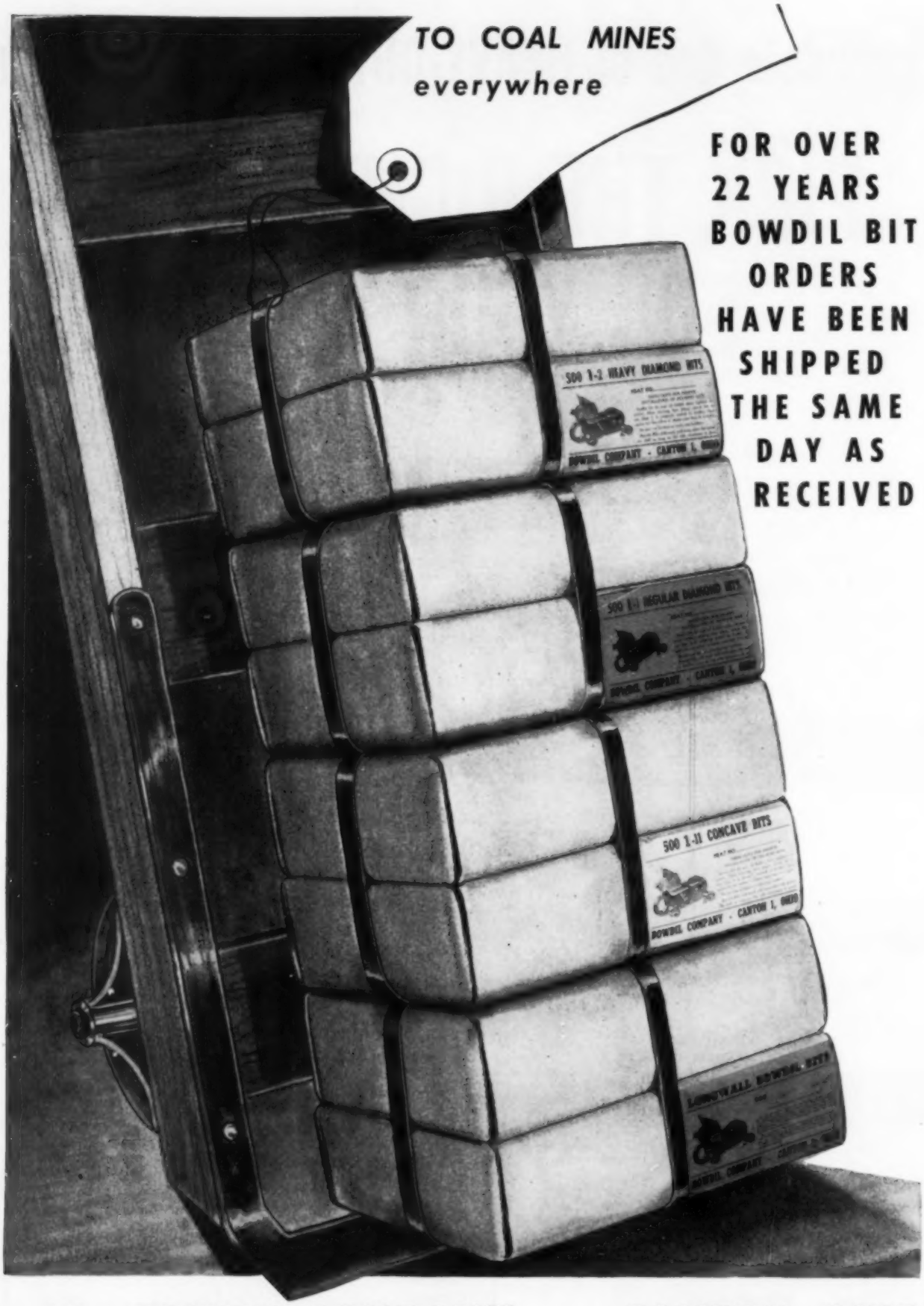

The BOWDIL COMPANY • CANTON OHIO

MORE SERVICE — LONGER LIFE

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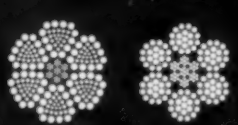
FLATTENED STRAND WIRE ROPE

If you have a problem spot for wire rope, where sheaves, drums or the rope itself is wearing too fast, solve it with Yellow Strand Flattened Strand! Yellow Strand Flattened Strand is formed of strands laid up in a triangular form to obtain a smoother outer surface. You get 10% greater metallic area, a corresponding increase in strength, plus a compactness unobtainable in round strand construction. It is not uncommon to get twice the service—and even more! This means you also save much of the time lost in frequent rope changes. Call your Broderick & Bascom distributor today or write us direct.



Compare Yellow Strand Flattened Strand with ordinary (at right) wire rope. In Flattened Strand you have twelve contact points, greater bearing area, smoother surface, less wear. Result: longer service, lower final cost!

Yellow Strand

BRODERICK & BASCOM ROPE CO.

4203 UNION BLVD. • ST. LOUIS 15, MO.

Manufacturers of Wire Rope for 79 Years

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No worries tomorrow . . . with track like this today

Here is a small corner of a complex system in West Virginia that can look ahead with a smile. The photo shows, in fact, that this mine has already turned its eye to tomorrow, and planned accordingly.

Notice that heavy rail, designed to haul the heavier loads that profitable mining requires. Notice those smoothly-flowing curves, the straight-as-an-arrow tangents, the neatly-fitting turnouts and heavily-ballasted track. These features all add up to high-speed, efficient operation . . . the kind of trackwork that quickly pays for itself in operating economies.

Bethlehem engineers helped build this job. Started right in on the ground floor and planned the layout to the owners' anticipated needs. Followed through on making the rail, the frogs, the guard rails, every last spike and splice bar. Then preassembled every component at our plant to make installation a simple matter.

Perhaps by now you suspect that your own layout could benefit by the "Bethlehem approach." Our engineers are ready to roll up their sleeves and go to work. If you look on this as a luxury item — well, they've got an eye-opener for you on that score, too. And no damage can be done in talking it over. Just say when!

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

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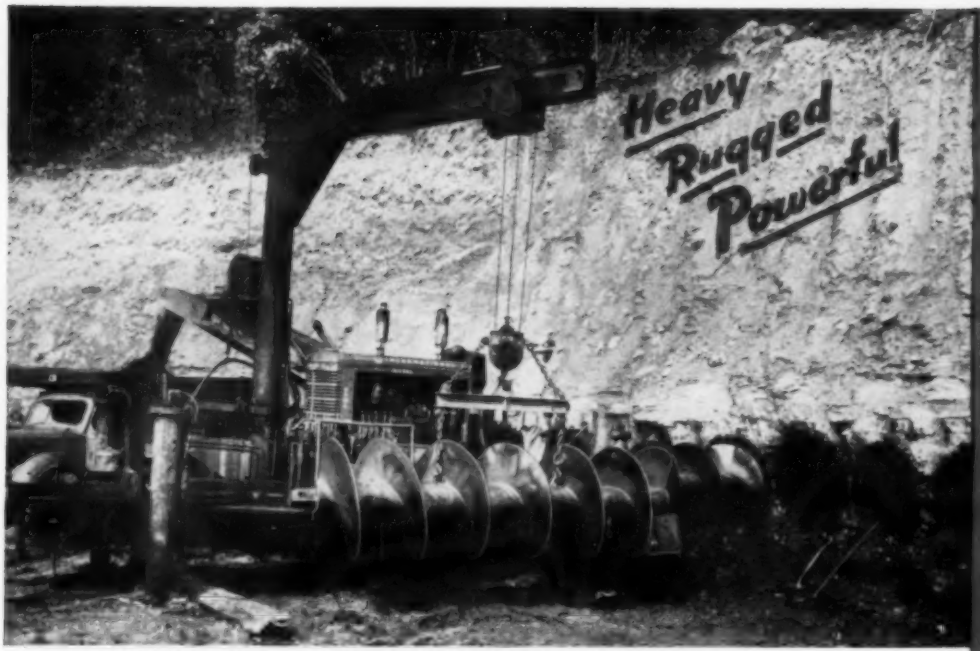

McCarthy Coal Recovery Drill, Model 1436-42, with 36" diameter augers 12' long as used by Excavators, Inc., Sommerville, W. Va.

● Robert B. Cleghorn, Jr., Hodgeville, West Virginia, reports his hydraulical, self-moving 42" McCarthy Coal Recovery Drill (shown below) mines "up to 500 tons of clean, low-cost quality coal per day." Cleghorn has a three-man crew—operates in pits as narrow as 34 feet. Operator has total vision, including the highwall. Model 12 handles 24' augers from 16" to 48" in diameter.

Hydraulically operated equipment on McCarthy Drills includes: jacks for levelling auger drill, auger guide, auger hoist, moving jacks and skids, and auger feed.

McCarthy Auger Drills Lower Mining Costs

McCarthy Coal Recovery Drill, Model 1242-36, using 42" diameter augers 12' long.

THE SALEM TOOL COMPANY

763 SOUTH ELLSWORTH AVE. • SALEM, OHIO, U. S. A.

Most Modern Coal Truck Money Can Buy!

New capacity . . . new frame . . . new engines . . . new work styling—a whole truck-load of new design and engineering advances that single out this money-making, money-saving 2-tonner as your best buy by a long shot!

Styling that speaks for itself—and speaks well of you and your business. It's functional styling, too. The new panoramic windshield adds to all-over design appeal and gives you a wider, safer view of the road. Running boards, you'll notice, are out-moded. Chevrolet's Safety Step is *concealed* and stays free of snow, ice or mud. Seats are softer. High-Level Ventilation maintains efficient air circulation in all kinds of weather.

High-Voltage power saves on operating costs—saves time, too. All four new Task-Force engines available in the heavy-duty class are sparked by a big new 12-volt electrical system. That means snap-of-the-finger starting even in cold weather, besides boosted generator capacity. The high-compression power of these great valve-in-head engines keeps you running longer between gas stops.

Anything else? Plenty. Capacities go all the way up to 18,000 lb. G.V.W.—available in 2-ton models. The frames are new—of 34-inch standard width to accommodate special bodies, and with more rigid, completely parallel side members. And there's new suspension, front and rear.

Power Brakes are *standard* on 2-ton models, optional at extra cost on others. Power Steering is also available as an extra-cost option. There's more still, but call your Chevrolet dealer for complete details. . . . Chevrolet Division of General Motors, Detroit 2, Michigan.

NEW CHEVROLET CHEVROLET *Task-Force* TRUCKS

Don't put all your eggs in one basket

Your production is always in jeopardy...when you depend upon a coal handling system that can be shut down by one small repair job.

On the other hand, an acf Mine Car System will substantially increase your opportunity for increased earnings. In terms of dependability and flexibility...two-way payloads...low cost operation...an acf Constant Haulage System is your best possible buy.

Your friendly acf Representative will gladly show you actual cost and production records...supplied by mine operators...which clearly prove our point.

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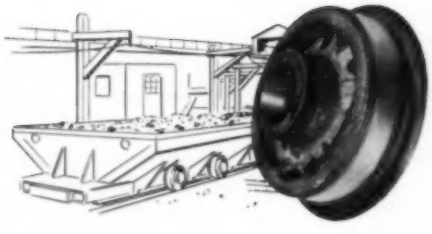


acf Replacement Parts for Mine Cars!
Give your cars a new lease on life...ask for literature on the new 'Load Support' Mine Car Wheels for longer wear!

acf **MINE CARS**

for Constant Haulage

HOW TO BUY CONVEYOR BELTS

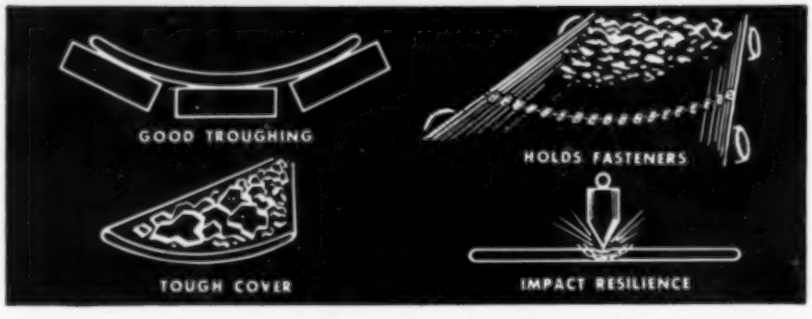
FOR FULL LOADS ON UNEVEN RUNS

...and get "More Use per Dollar"

Look for a belt with engineered features that assure maximum troughability, resistance to gouging, tearing or ripping, and dependable fastener-holding qualities.

Good troughing is the first thing to look for in an efficient, straight running conveyor belt on up and down grades. To trough properly, a belt must have full freedom and flexibility to make adequate contact with the center rollers. Conventional duck belting strong enough to handle the heaviest loads is stiff and "boardy", does not trough readily and consequently causes load spillage . . . especially where belts must follow uneven contours, as in mining operations.

Specify by name the one belt specially built to resist gouging and tearing, to trough deep and carry a full load regardless of the ups and downs of the run . . . specify Ray-Man "F" Conveyor Belts.



RAY-MAN "F" CONVEYOR BELTS

The elastic nature of special strength members and synthetic outer plies (both top and bottom) give Ray-Man "F" Conveyor Belts unusual crosswise flexibility to trough easier. It permits deep loads in narrow widths and has exceptional flexibility around small pulleys for low head-room operations. It requires no breaker strip, yet resists gouging, tearing and ripping better than other constructions and holds fasteners under severe operating conditions.

Let an R/M representative show you the advantages of Ray-Man "F" as well as other R/M feature conveyor belts . . . Homocord, with extra cushion for shock loading . . . Ray-Man Tension-Master for long lifts and high tensions. R/M heavy duty conveyor belts have the exclusive "XDC" Cover that greatly prolongs belt life with its extra protection against wear, tear, cuts and abrasion . . . gives "More Use per Dollar".

RM-501-UBC

MANHATTAN RUBBER DIVISION—PASSAIC, NEW JERSEY

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Other R/M products include: Industrial Rubber • Fan Belts • Radiator Hose • Brake Linings • Brake Blocks • Clutch Facings
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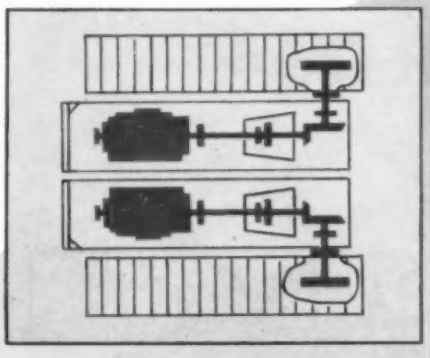
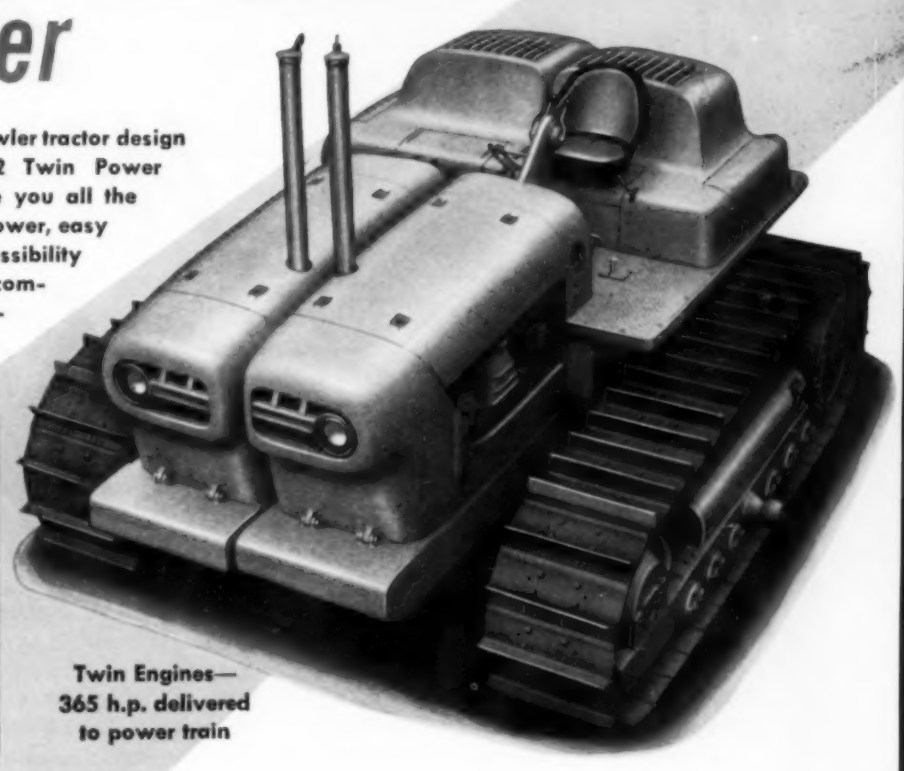
Biggest Tractor News in Years...

the "Euc" TC-12 Twin Crawler

Here's a completely new concept of crawler tractor design and performance . . . the new TC-12 Twin Power Euclid. It's designed and built to give you all the features you want in a tractor—more power, easy operation, greater workability and accessibility for servicing . . . and all power train components are matched, with years of application in earth moving equipment.





**Twin Engines—
365 h.p. delivered
to power train**

SPECIFICATIONS

total h.p.—388 h.p. at rated speed	
available for tractive effort—365 h.p.	
speeds—3 speed ranges forward and reverse to 8.3 mph	
drawbar pull (bare tractor)—forward and reverse	54,000 lbs. low range 53,500 lbs. intermediate 53,000 lbs. high range
track width (standard shoe)	26"
track gauge	110"
overall width	11' 4"
overall length	16' 2"
height (excluding stacks)	7' 11"
drawbar height	23"
ground clearance	20"
operating weight (bare)	approx. 58,000 lbs.

Powered by two diesels with separate Torqmatic Drives for each track, the TC-12 has 365 h.p. available for tractive effort—a smooth steady flow of power to meet any job requirement. There's no master clutch and no manual gear shifting . . . the operator simply moves a lever to select one of three speed ranges—forward and reverse—for travel speeds up to 8.3 m.p.h. Maximum drawbar pull is equal to, or greater than, the weight of the tractor and any attachments.

Each half of the tractor is separate and free to oscillate on a single transverse shaft. This gives the TC-12 maximum stability and traction on rough ground. The tractor can be easily separated into two halves for shipment when necessary.

Never before so much workability!

EUCLID DIVISION GENERAL MOTORS CORPORATION, Cleveland 17, Ohio

Euclid Equipment

FOR MOVING EARTH, ROCK, COAL AND ORE

GM GENERAL MOTORS

(PLEASE GIVE THIS ADVERTISEMENT TO YOUR BLASTING FOREMAN)

To connect the Detonator with the Primacord Trunk Line use FRICTION TAPE. You can detonate Primacord with fuse and cap or electric blasting cap. Lay the cap alongside of the Primacord with the business end of the cap pointing in the direction that the Primacord will detonate. Tape the two snugly together, so that you have a tight connection.

FIRE WHEN READY

with PRIMACORD

Take your time — there's no hurry. The holes are primed and hooked up with Primacord, as shown below. *But the blast won't "go" until you're ready.* Primacord is *insensitive* to stray electric currents and ordinary shock. There is a case on record where a direct hit by lightning failed to detonate it! Everything ready now? . . . OK . . . attach the cap to the end of the trunk line. Use friction tape as shown above. *Fire when ready* — and you'll have easy digging, because you were able to *plan it that way* — with PRIMACORD!

See your Explosives Supplier, or write to

THE ENSIGN-BICKFORD COMPANY • SIMSBURY, CONNECTICUT

Also Safety Fuse, Ignitacord®, Quarrycord, Blasting Accessories

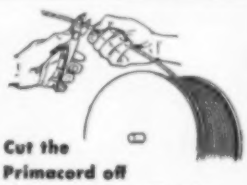
Established 1836

To connect a Branch Line of Plastic Reinforced or Plastic Wire Countered Primacord with the Trunk Line use this DOUBLE HITCH in the textile-covered Primacord Trunk Line. *Draw it up as tight as you can, and make sure that the Branch Line leads off at a RIGHT ANGLE to the Trunk Line.*

PRIMACORD®

DETONATING FUSE

PROVED AND APPROVED



Cut the Primacord off the Spool Immediately

Make this a *safety habit!* As soon as you have taken off the length of Primacord you need for a down-hole or for a trunkline, *cut it off the spool! Don't waste a second — do it now!*

To lengthen a Trunk Line of Plain or Reinforced Primacord, tie a SQUARE KNOT. *Draw it up as tight as you can* — it won't slip back. Caution: don't use any knot in a hole — it might break or hang up explosives when loading.

To connect a Branch Line with the Trunk Line

Use this HALF HITCH for Plain and Reinforced Primacord. *Draw it up as tight as you can, and be sure the Branch Line leads off at a RIGHT ANGLE to the Trunk Line.*

P-22

Devoted to the Operating, Technical and Business Problems of the Coal-Mining Industry

Coal Age

JUNE, 1955

IVAN A. GIVEN, EDITOR

Definite Gain

THE BLOOM seems to be departing the natural-gas rose, even though recent weeks have brought announcements of campaigns to raise funds for two new lines: one from Colorado to Idaho, Oregon and Washington, and another from Louisiana to Michigan. The screams of anguish emitted by public officials in major consuming states in testifying on proposed legislation exempting wellhead prices from Federal Power Commission control confirm publicly the suspicion that the natural-gas honeymoon is about at an end, if not already so, despite plans for new lines and new distribution facilities.

Consider two examples of public reaction at the hearings. Francis T. Mylott, New York State Public Service Commission, noting that over 4,000,000 consumers in New York state had converted to gas under assurances that it would be cheap and abundant, made this point: "The producers and pipeline companies devoted their facilities to the public service and obtained a captive market. We cannot stand idly by and permit them to fleece it." That same day, Mayor Wagner, of New York City, pointed out that in the five years or so "since the use of natural gas was first taken under consideration for the City of New York, in the belief that its use would provide a more-economical source of fuel, the cost has risen 44%." Both Mayor Wagner and Mr. Mylott want a federal lid on the price increases at the wells, a ban on escalator clauses in contracts and other assurances that prices will not go up. But you don't reverse trends that easily, and their chances are dim at best. That goes for other areas of the country as well.

Even if Congress takes no action, the airing given these and other recent developments provides additional reason for repeating a statement made in the February issue of *Coal Age,* to wit: "Natural gas . . . may be closer to its competitive peak than might appear at first glance." In fact, the statement might be strengthened to read "Natural gas probably will reach its competitive peak in the near future if it hasn't done so already." A similar statement can be made about oil, though some of the reasons are different. This of course does not mean an immediate flood of new business for the coal industry, but it does mean the development of a climate in which low cost, high quality, modern burning equipment and good service, backed up by an expanded research program and hard-hitting merchandising can begin to regain old business and create new at an accelerating rate. That is a definite gain.

Result-Getters

AFTER A SAD FEBRUARY, when it looked like anthracite and bituminous were beginning to backslide rapidly, both industries got back into the safety swing in March with new lows in fatality rates for the quarter. Thus, they are back up to the line and in position to move forward again, not only in laying the groundwork for general safety improvement but in getting results in joint labor-management-government campaign to reduce roof-fall accidents.

Education and training remain the most-promising avenues to accident prevention, since they enlist the active and effective cooperation of the man who can really advance the cause of safety—the individual mine worker himself. The roll of companies that have proved the validity of this principle grows day by day. One name on that roll is the Peabody Coal Co., which has trained 1,631 men at its Illinois mines since Feb. 23, 1953, with Joe Craggs, field superintendent, and L. H. Johnson, safety engineer, backed up by Otto Gressens, president, and H. C. McCollum, vice president, supplying the push. Results? Aside from major reductions in total injuries, in lost-time injuries and in severity, 1954 was the first year in Peabody mining history without a fatality. Production was 6,316,000 tons.

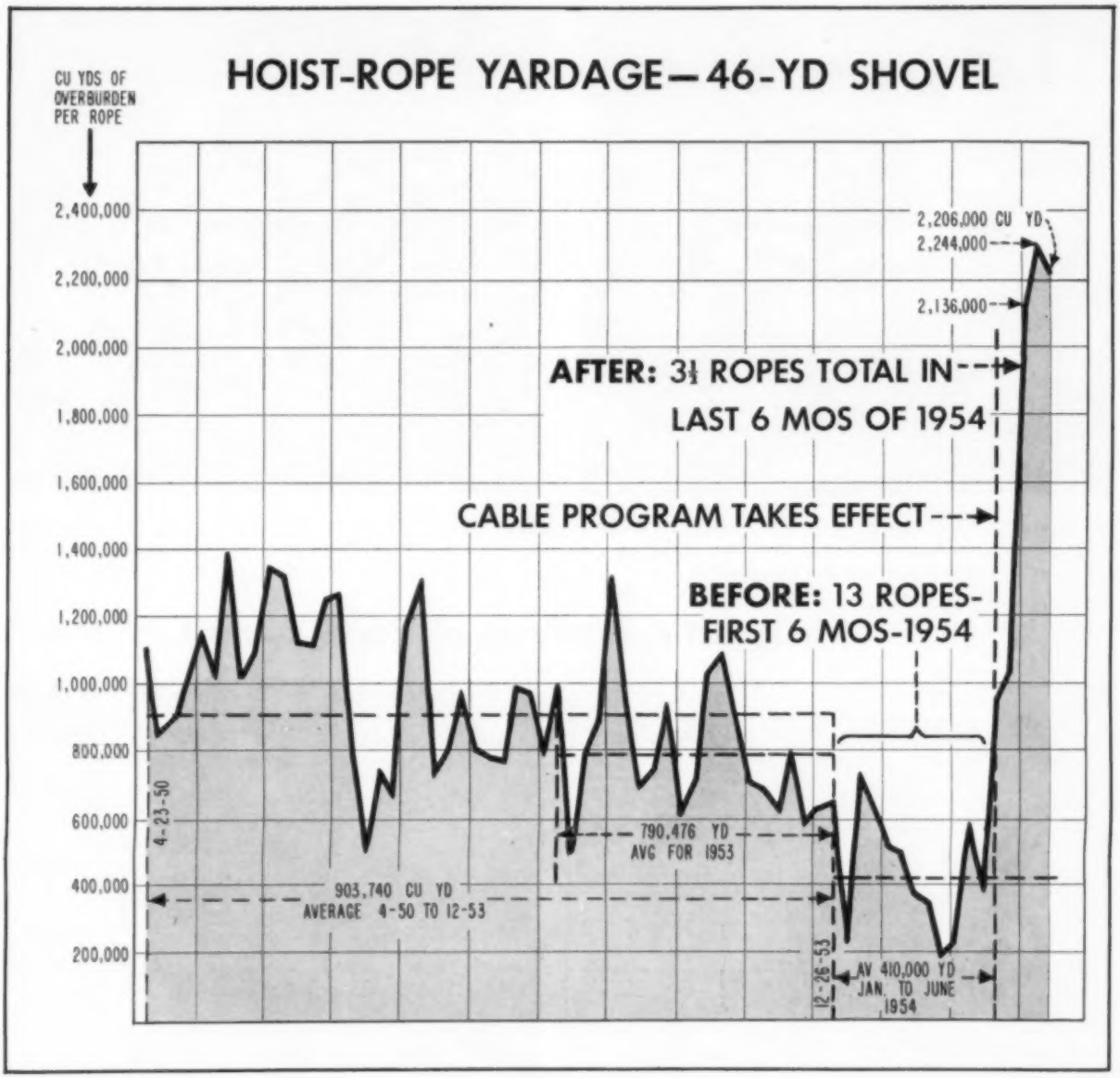
LONGER LIFE for wire rope on big 46-cu yd shovels at Hanna Coal resulted from careful engineering analysis to discover causes of difficulties, followed by engineering and operating co-operation to overcome them.

Getting More Life From

Problem: Short life for expensive hoist ropes on 46-cu yd shovels.

Solution: Engineering analysis to determine causes of short life, followed by the development of methods of eliminating these adverse factors. Engineer and operator co-operation a basic ingredient.

Results: Better than 2,200,000 cu yd per rope in last 6 mo of 1954, compared to 410,000 yd per rope for first half of year.



HOIST-ROPE LIFE UP FIVE-FOLD attests to success of Hanna's improvement program, as shown by this graphic record of the material handled per rope on one 46-cu yd shovel.

Big-Shovel Ropes

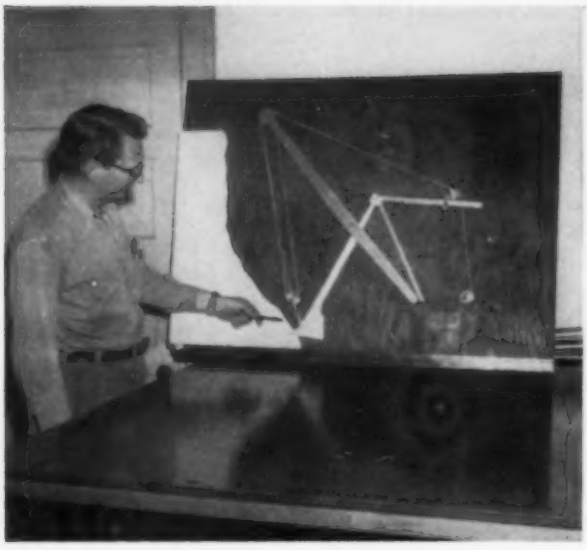
By A. F. MEGER
Maintenance Engineer
Hanna Coal Co.,
St. Clairsville, Ohio

WHAT'S WRONG with the hoist ropes on our four Marion 5561 46-yd power shovels? Why do we have so much variance in the life of our ropes, whether purchased from the same company or from several companies? These were some of the questions asked by operating officials at Hanna Coal Co. in 1953, when they were seeking ways to get more life from wire rope. To get the answers, Hanna's engineering department, under the direction of Andrew Hyslop Jr., chief engineer, was assigned the task of coordinating and interpreting all pertinent information.

All operating, maintenance and engineering personnel were alerted to the problem. The author and A. L. Hawthorne, mechanical engineer, were assigned the job of getting the answers.

The first step in improving rope life was made early in 1953 when Leo Inskeep, welding superintendent, and Pete Singer, mine superintendent, worked out a method to cut away a section of the shovel boom on the 46-D unit to eliminate surface damage to the rope caused by sawing action of the rope on the boom. This was so successful that all other shovels were altered similarly.

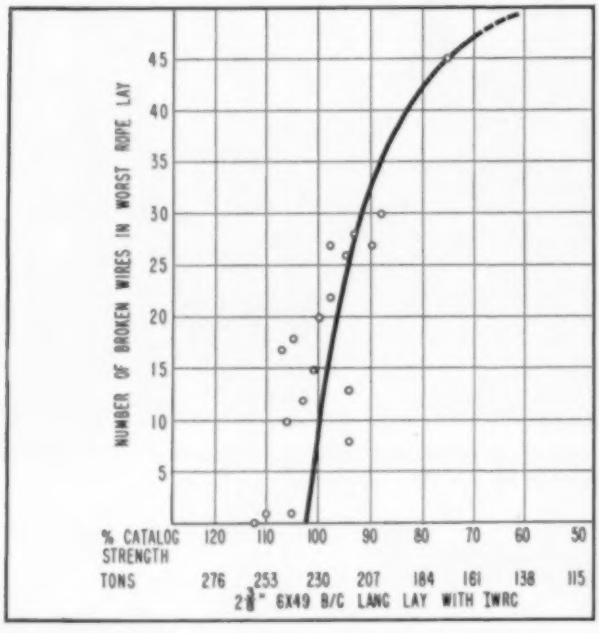
In July, 1953, Mr. Hawthorne was assigned the job of collecting samples of every hoist rope removed from a shovel. He took as many samples as necessary from each rope so that



SHOVEL MODEL is used to analyze rope wear and damage. A. F. Meger, Hanna maintenance engineer author of this article, illustrates position for greatest wear.

ROPE SAMPLES were taken of all hoist ropes removed from shovels. Types of damage and wear were studied and samples were identified for future reference.

Scientific Analysis of Rope Wear Led to . . .



TEST RESULTS of worn ropes illustrate relation between number of broken wires and rope strength.

ENGINEERS assigned to rope program include A. L. Hawthorne, mechanical engineer (left), and Mr. Meger.

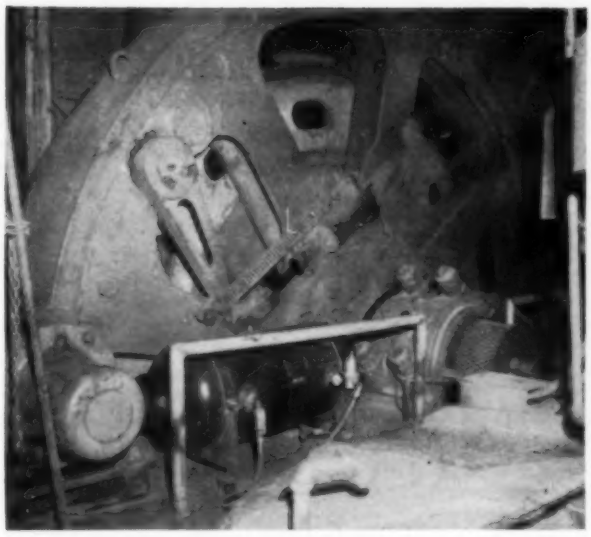
every type of damage could be studied. Samples were inspected for external wear, corrosion, bending fatigue, lubrication and internal wear, then filed for future reference. The project was given high priority early in 1954 when rope life on the Bradford 46-C shovel dropped from 25 to 10 days. Results of the program have been highly satisfactory and rope life has been greatly increased.

OPERATING CONDITIONS KEY TO ROPE WEAR

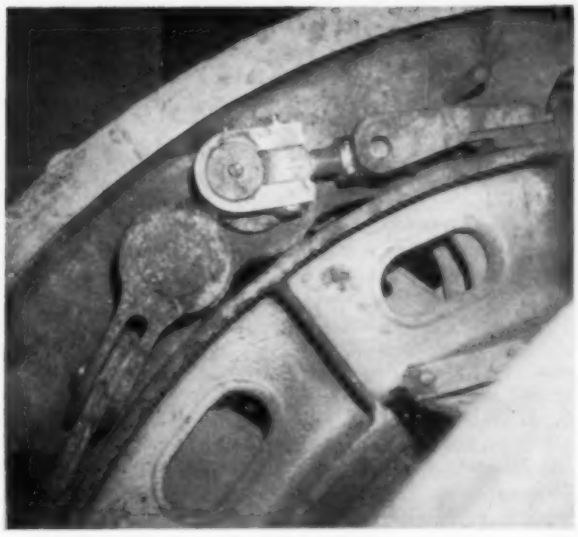
Shortly after rope samples began to be gathered, it became apparent that the trouble was not in the rope but in the way it was being used. Thus the study showed clearly that troubles would have to be corrected on the shovels before the rope manufacturers could be blamed for an inferior product causing the failures.

From the examinations of the rope samples, plus accurate strain-gage readings on the hoisting mechanism of the shovels, it was evident that the following corrections were needed:

1. Air pressure on the hoist-friction band had to be stabilized. Bands were slipping when the main tank pressure was at the low point of the allowable differential between cycles. The



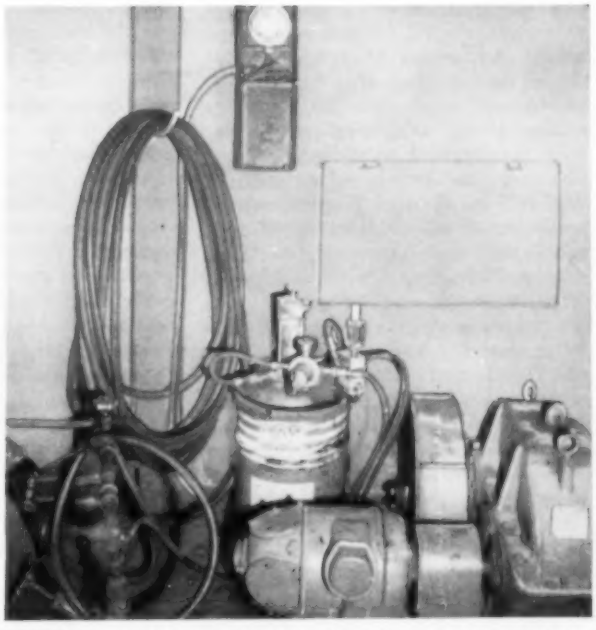
AUXILIARY AIR TANK maintains constant pressure on hoist-friction bands, eliminating slipping which caused operator to overtighten band, overloading ropes.



UNIVERSAL JOINT on friction-band adjusting bolt eliminated breakage of hoist friction bands caused by misalignment of band and shroud.

Effective Corrective Measures Like These

REDESIGN of dead-end socket and wedge and dead-end link eliminated breakage and side scrubbing on padlock sheave.



AUTOMATIC LUBRICATION of hoist rope is handled by this time-controlled equipment in 46-yd shovels.

operator would tighten the band to increase friction until the band locked at the high point of the compressor cycle. Now the friction band could not act as a safety device. This resulted in extreme overloading causing the rope to break at the socket, plus other unseen damage. Strain gage tests proved that instantaneous double and even triple loadings can be and are present under certain conditions. This proved why we can pull a 2⅜ in rope in two without any difficulty whatsoever, if the friction is not functioning properly.

To remedy this condition, an auxiliary air tank with a check valve and pressure regulator was installed to keep air pressure on the bands at a constant value, regardless of pressure in the main tank.

2. Breakage of hoist friction bands had to be eliminated. Misalignment of the band and shroud was found to be the main trouble and was eliminated by redesigning the friction adjusting bolt, incorporating a universal-joint action.

3. Point sheaves had to be redesigned and definite changes made in the heat-treating procedures. Sheaves with various degrees of wear were on the various shovels and therefore

almost every condition possible could be studied when a new rope was put on. It was soon discovered that ropes wore better in a sheave that was opened up by wear. This is peculiar to the 5561 model shovel in that the machine frequently digs with a wide fleet angle as a result of operating conditions.

A new point-sheave assembly is being fabricated in the Hanna central shop. The major changes are the use of Carilloy T steel and redesigning of the throat. From the original 70-deg included angle in the throat, we expanded to a 90-deg included angle with a rope groove machined to fit a 2½-in rope instead of a 2⅜-in rope. All tests and inspections showed no advantages for an exact rope groove —for example, a 2¾-in groove for a 2⅜-in rope gave excellent wear characteristics. Some sheaves were worn enough to fit a 4-in-diameter rope, and still gave good life. However, the sides of the throat must be polished and there can be no ridges. On the other hand, a snug groove is definitely detrimental, causing excessive wear.

With the new design, another aim is to eliminate some of the external wear now caused by extreme differences in peripheral speeds of the sheave throat from the smallest diameter at the groove to the larger diameter at the outside of the sheave. Heat treating will be carried out over the entire throat surface to a Rockwell "C" hardness of about 42. Originally the throats were hardened one-third the way outward from the groove. This caused a high ridge to form at the change in hardness soon after the sheaves were installed. The ridge actually caused the rope to spark and smoke when digging at a wide fleet angle. As a result of this heat and ensuing instantaneous air quenching, a martensitic structure was formed in the rope at the points of contact, producing hard spots on the wires. Cracks were formed and, as a result, wires started breaking soon after this condition was established.

The old sheaves have been reworked and as many of the new design features as possible have been incorporated in them. Groove diameters have been increased and the sides of the throat have been highly polished. Polishing and evenness in heat treating are extremely important.

4. The dead-end socket and wedge had to be changed slightly and tolerances reduced. A group of new and used sockets were assembled and tested at the Roebling laboratories to determine the loss in strength in a used socket. These tests along with actual field tests proved the importance of properly fitted wedges and sockets. Some slight changes in design were recommended by W. I. Lex, assistant to the chief engineer, Wire Rope Div., John A. Roebling's Sons Corp. These were incorporated in the new units and proved to be very beneficial. In fact, there hasn't been a broken rope resulting from a faulty wedge and socket since the new units were put in use. Constant magnaflux inspection to determine cracks in these highly stressed units, has prevented at least four assemblies from being installed because of hidden flaws and cracks.

5. Redesign of the dead-end link was desirable. The dead-end link is the hitch between the wedge and socket and the dipper sheave. The purpose of the design change was to make the hoist rope enter and leave the dipper sheave without side scrubbing. At the same time bearing loads were adjusted to reduce dead-end link breakage.

6. Ropes must be lubricated properly. This was found to be the factor contributing the most to rope life. Many persons in the organization were of the opinion that a wire rope was lubricated for life. As a result drip oilers were somewhat neglected and regular lubrication was not practiced.

The first step in improving rope lubrication was to start a program of lubricating by hand. This was a laborious process and involved carrying several buckets of oil to the point sheaves and pouring it over the rope.

From this simple method, rope lubrication has been developed into an automatic procedure. The heart of the system is a pressure greasing system that was converted to oil. Booms are piped and oil is delivered at 1,000 psi to an accumulator mounted over the point sheaves. From the accumulator, oil goes to a solenoid valve actuated by a timing mechanism. The timing mechanism in turn is controlled by the lowering time of the bucket.

The actual delivery of oil is done through a Chicago Spraying System atomizing nozzle. Various types of lubricants were tried and the best results were obtained with an extremely light lubricating oil having a 100-sec viscosity at 100 deg and a pour point of —20 deg F to facilitate handling in cold weather. To date we have found no advantage in using EP lubricants. Our lubrication engineer, Mr. Wayne Fuhr, intends to carry on a series of controlled experiments to prove or disprove these initial findings.

With the light oil, any dirt which collects on the rope actually slides off. The rope remains very clean over the area receiving the most wear. This clean surface in turn facilitates rope inspection, making it possible to check for broken wires or a disintegrating core. The quantity of oil used averages 1 qt per shift at a cost of about 8c per shift.

7. The second most important major change was the reversal of the rope. Reversals and rope changes are governed by the number of passes the bucket makes plus the external condition of the rope. Reversing helps distribute wear by running the worn section back on the hoist drum during the second period of use.

Under the severe conditions at the Hanna operations, a rope is operated for 30,000 passes or slightly over 1 million cu yd. If conditions are favorable, a rope may be run as many as 35,000 passes, or 1¼ million cu yd. The second run of the rope in the reversed position is governed entirely by the physical condition of the rope. Thus far, Hanna has been getting over 2 million cu yd per rope on the 46-C shovel and sights are set on upping it to 3 million yd when the new point sheaves are installed. Our 46-A shovel just missed a 2½ million-yd run when the rope was damaged by rock getting into the dipper sheave.

An important outcome of the rope program is that sheave changes are now governed entirely by rope wear. Every rope that is removed from a shovel is measured and inspected for wear points and results are carefully marked on a chart. A scale model of a shovel was built and inspection results are used to determine the wear points. The dipper is placed in the normal digging positions and the wear points are checked on the model rope. Thus if a sheave is causing excessive wear it readily can be spotted by position and by the characteristic marks left on the surface wires.

Another important change was adjustment of electrical equipment in the shovel. It was learned that when the shovel was digging in the toe of the bank, the swing power was out of proportion to the hoist power and speed. Swing speed is governed by hoisting and lowering speeds and therefore to prevent the hoisting rope from cutting into the side of the boom, the swing power was reduced. The shovels still have all the swing power needed but the hoist power now is able to keep the dipper moving upward with a minimum of rope rubbing against the boom. All of our rope yardage increases have been made after the stall bail pull was increased to 450,000 lb and bucket

speed increased substantially. We have deliberately used these test ropes under the toughest conditions possible to make sure we were not unconsciously favoring the ropes during the experiments.

CO-OPERATION KEYS PROGRESS

Co-operation between shovel crews, production supervisors and engineers was of great importance in improving rope life. The 46-C shovel crew was very interested in the project from the start and offered suggestions that proved very helpful. To acquaint the crews with wire-rope construction and to demonstrate the strength of wire rope, short instruction periods were held. Wire-rope samples were dismantled and discussed and a chart showing the relationship between strength and wear was blueprinted and posted in the operator's cabs for all to use as a guide during daily rope inspections.

The first hoist-rope reversal experiment began on June 14, 1954. Inspections were made each day to detect any danger signs. This included climbing up to the point sheaves, which are 120 ft above the coal, then hoisting the bucket up and down slowly so every foot of rope could be inspected for damage.

The 25th day passed with the rope showing no signs of fatigue or excessive wear. After 32 days the rope was reversed and operated for another full month, handling a total of 2,135,958 cu yd of material—over 2½ times the 1953 average per rope.

After the test rope was removed from the 46-C shovel, sections were cut and carefully inspected for internal weaknesses. Other sections were cut and sent to the manufacturer for inspection and pull tests. Here are the results of those tests:

1. Rope diameter was 3/32 in under the 2⅜ in diameter in the section with the most wear—near the middle of the rope. (Original length was 550 ft.)

2. External wires in strands had lost only 25% of their original area.

3. The wire-rope core had many breaks in it, but still held the strands in place, giving ample support.

4. Lubrication was very good inside the rope, indicating penetration with the new spraying system.

5. All samples pulled apart tested better than 230 tons, the new-rope guaranteed strength, with the poorest of three samples testing 255 tons.

The foregoing results indicated that the program could be continued without sacrificing safety.

GETTING MORE ROPE LIFE

As a reminder and suggestion to operating supervisors and shovel crews the following group of recommendations were made by the engineering department:

1. Keep the rope and sheaves wet with a light oil similar to a 100 sec lubricating oil. Care and judgment must be used so an excess is not applied and thus interfere with the hoist friction band.

2. Inspect sockets and wedges for perfect fits on the rope and defects in the castings themselves. Route assemblies through central shop after each rope change. Fits are checked and the entire unit magnafluxed.

3. After socketing a rope, insist on the practice of first lifting an *empty* bucket, then picking up only *partial* loads on the next three passes before resuming normal digging operations. These few minutes, used for breaking in the new rope and permitting it to adjust itself around the wedge, will pay off in fewer broken wires and strands. If the rope strands do not seat themselves properly but gap open around the wedge, resocket immediately or you stand a good chance of pulling the rope apart at this curve.

4. Do not use a burning torch near the rope. Use a bolt cutter on the small wires securing the new rope to the wooden reel. If the temperature of part of the rope is raised above 400 deg F. the strength characteristics of the affected wires change and the rope is weakened.

5. When lowering the dipper sheave for greasing and resting it on the spoil, make sure that no foreign material drops into it. A stone passing between the sheave and rope can result in the destruction of the rope. Rubber guards are being installed on all future padlock assemblies to help prevent this.

6. Until permanent power reels are available on all shovels, during the reversing procedure, it will be necessary to stretch the rope on the coal prior to picking it up with the portable truck-mounted power reel. Care should be taken to pull the rope in a straight line—not doubling or tripling the loops.

7. Do not permit the bulldozer or other heavy equipment to run over the rope.

8. Whenever a new or used rope is installed, oil the rope with the manual control for the first few minutes of operation to assure proper lubrication until the automatic system can take over.

9. Clip all broken wires as soon as possible before they cut into and damage others in the immediate area.

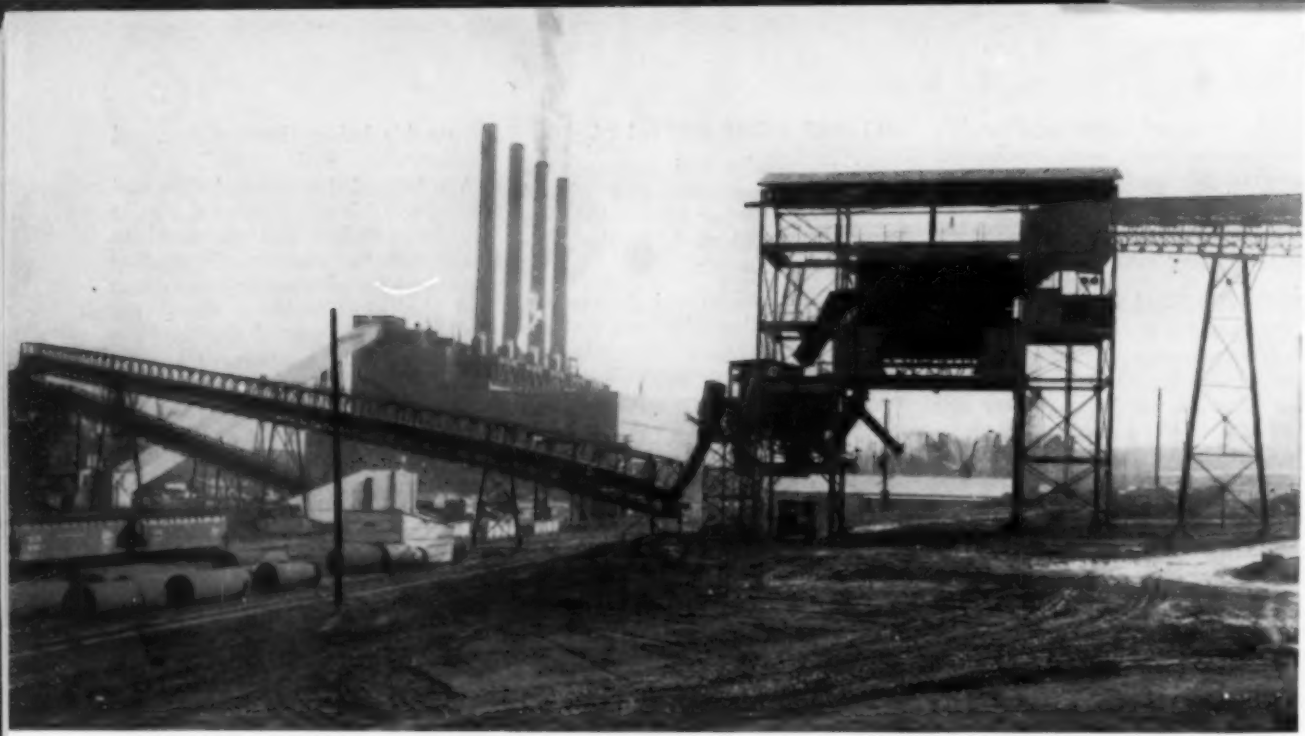
We learned that external wear and damage is almost incidental, for it can be watched and measured to make sure the rope is safe. But as soon as internal damage takes place and the wires inside a strand are broken or even moved slightly from their original position, take no chances. It is only a matter of time before a sharp load will snap the strand and perhaps the entire rope. We have deliberately permitted ropes to remain in use with various types of damage so we could gain experience that can be listed for future inspectors.

Only one rope has failed thus far without giving warning of any kind and it is now at the factory for complete chemical and physical analysis. Considering the number of ropes broken previous to our rope program, our percentage is very low. We intend to keep it that way, for our primary interest in this project is safety, with other benefits accepted as logical outgrowths of a good program. We believe when equipment is made safer it automatically works longer and better.

Our rope program is well under way as far as our shovel parts are concerned. We now start in on the next phase of our plan, testing various constructions to determine what is best for our particular needs. At present we are using a 6x49 construction with Independent Wire Rope Core. The first test rope to challenge this is a 6x43 SpringKore, made specially for a test run under controlled conditions. We intend carrying on these tests whenever a design is presented that has potentialities.

With new construction ideas being presented to us, plus all the changes incorporated to date as listed, I sincerely believe we have a good chance of hitting a 3,000,000-cu yd rope life in the next year or two.

A new rope for a machine of this type costs approximately $2,300. With constant operation at high capacity it was necessary to change at least one rope per month and sometimes as high as two per month. This of course represents a major cost item on the machine. Previous attempts at rope improvement by ourselves and the rope manufacturers had met with little success. It was necessary to attack the problem with careful engineering analysis to disclose the true cause of the difficulties, then devise ways to overcome them. This requires a concerted effort by competent engineering and operating personnel.



RUN-OF-MINE is broken to minus 1¼, weighed in transit and delivered to power company's main conveyor for immediate use or storage. A fifth generating unit is under construction to round out 525,000-kw capacity of plant.

On the Banks of the Wabash . . .

A Power-Package for

Here's how coal is produced at Viking mine, Terre Haute, Ind., to fuel a power company's generating station, and how the coal is transported directly from underground workings into power-plant storage.

By HAROLD DAVIS
Associate Editor, COAL AGE

ONE OF THE VIGOROUS CITIES in the land is Terre Haute, Ind., the hub of the Hoosier State's coal industry. In recent years a growing num-

Mining the Coal: Up to 26 Tons per Face Man per Shift

FACE OPERATIONS with conventional machines calls for steady loading of 8½-ft cuts from 22-ft rooms.

DRILLING UNIT consists of maneuverable booms mounted on mining-machine truck in Viking Coal's shops.

SLOPE BELT emerges from portal (foreground) carrying 350 tph through first step of direct haul to power plant.

Modern Industry

ber of industries have discovered the advantages of having manufacturing facilities at "the nation's crossroads." This industrial activity in the community consumes an ever-increasing amount of electrical energy, however, and that is where coal, a prime source of energy, comes into the picture.

Power for the Terre Haute community and other areas in the state of Indiana is generated at two power plants of the Public Service Co. of Indiana, Inc., located on the Wabash River near the city. The newer of the two, the Wabash Plant, is situated about 5 mi north of the center of town, on the west bank of the river. Fuel for this plant—coal, of course—is produced at nearby Viking mine, and moves in a stream from the underground workings directly into the bunker or storage yards of the power company over an eye-catching system of belt conveyors. The integrated mine and power plant are a striking example of how separate companies can pool their specialties for highest efficiency in producing power, and both mine and power plant are prepared to grow together as the demand for energy increases.

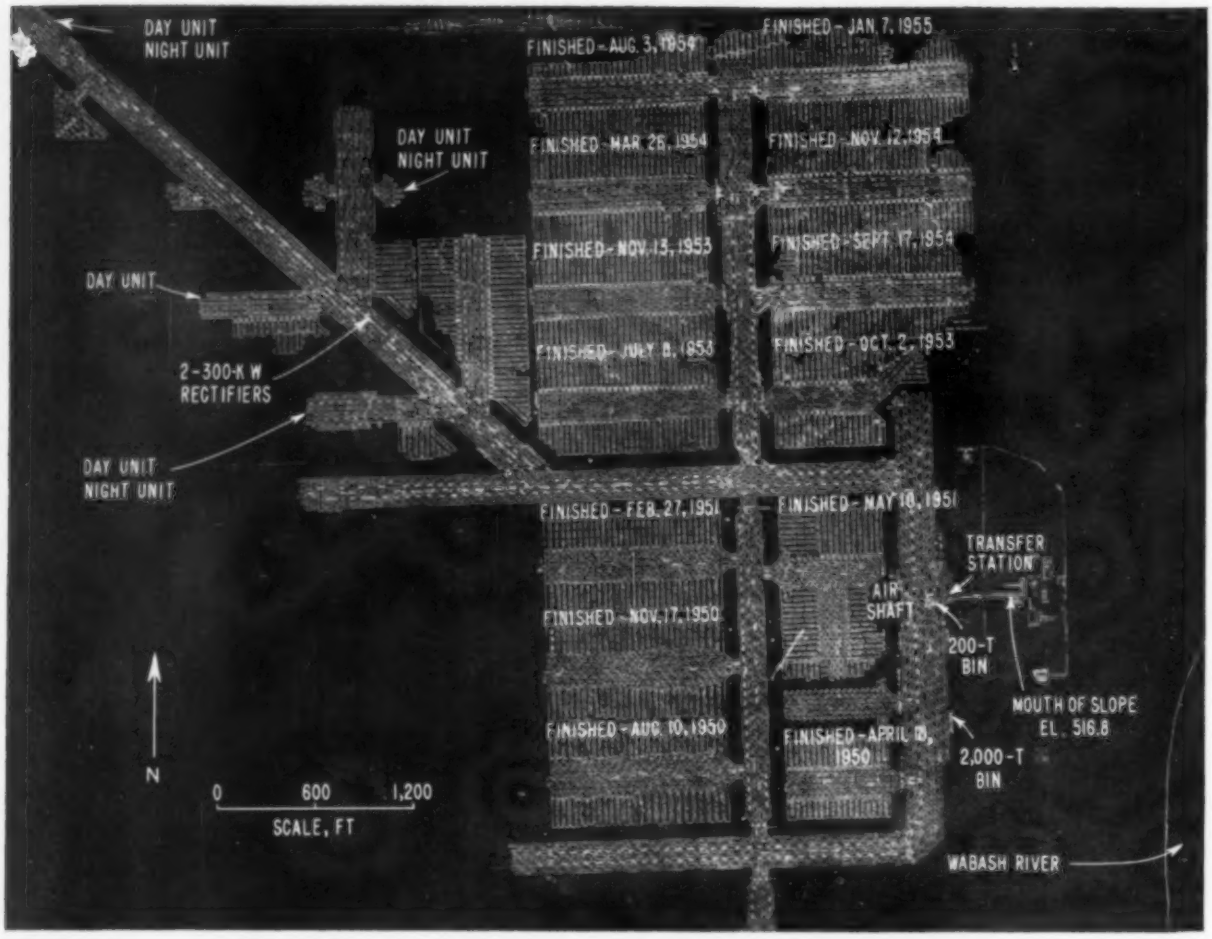
A fifth generating unit now is being added to the power plant to round out a capacity of 525,000 kw at the end of this year. In 1954, Viking mine produced about 500,000 tons of coal to feed the hungry plant, and more will be needed as time goes on. Storage capacity at the plant is 6,000 tons in station bunkers and 500,000 tons in the yards.

The mine is operated by Viking Coal Corp., a wholly-owned subsidiary of Walter Bledsoe & Co. Development of the mine was begun in July, 1947, and the first coal was produced for shipment in 1948. However, the direct link with the power plant was not made until February, 1953. Top executives of the coal company are: W. S. Webster, president; Birch Brooks, vice president and general manager; Walter A. Bledsoe, vice president; and F. W. Beushausen, secretary-treasurer.

A total of 195 men, underground, surface and supervision included, are

Transporting the Coal: Shuttle Cars, Belts, Mine Cars

SHUTTLE CARS discharge to 36-in panel belts which in turn load 5-ton drop-bottom cars for haul to slope bottom. Day-shift coal is fed directly to slope belt. Second-shift coal is stored in mine and reclaimed on following day-shift.



Viking Features: Streamlined Transportation, Service-Labor Economy

CONCENTRATION OF OPERATIONS in the panels driven from the angle entry lead to highest efficiency. Extensive development in other sections will permit increase in production on short notice.

engaged in mining the power-plant fuel. Top management at Viking is especially proud of its record of 247 days' operation out of a possible 249 days in 1954. One of the idle days was Christmas Eve, when an extra holiday was agreed upon. The other was a result of one of those misunderstandings which sometimes arise.

Colvin Burk, chief engineer, is in charge of operations at the property. Underground supervision is headed up by Stewart Johnson, superintendent, assisted by Charles Andrew, dayshift mine foreman, and Henry Robertson, night foreman. Ray Biggs is electrical engineer, and Henry Cruikshank is master mechanic. Providing mining supplies when and where they are needed is the responsibility of Gene Gambill, purchasing agent.

SURFACE TRANSPORT: Mine to Plant, Non-Stop

The transportation link between the mine and plant operates only on the first shift. The process begins at the bottom of the slope where the coal is taken from a 200-ton bin and transferred to the 36-in slope belt by a scraper feeder. The coal being produced on the first shift is dumped directly from the mine cars into the 200-ton bin.

Coal produced on the second shift is dumped into a 2,000-ton bin, located about 800 ft south of the slope bottom, and is retrieved during the following day shift and returned to the slope-belt loading station on a reclaiming belt conveyor. The 2,000-ton bin extends from the workings in the No. 5 seam to openings in the No. 4, 105 ft below. The reclaiming conveyor is installed in a rock tunnel which was driven down to the No. 4 seam to provide access to the bottom of the storage bin.

The main slope belt (650-ft centers, 12½-deg dip) discharges on the surface through a lowering chute onto the Bradford-breaker feed conveyor, which is another 36-in belt. The breaker is a 12x24-ft McNally-Pittsburg unit which reduces the R-O-M to minus 1¼ in. Reject from the rotary breaker is stored in an elevated hopper for truck disposal.

Product of the breaker is fed onto a short weighing belt equipped with a Merrick Weightometer, then through another lowering chute onto the Public Service Co.'s main conveyor which transports the coal into the power-plant bunkers on storage area.

The entire system right down to the underground bins is interlocked with the Public Service Co. conveyor to prevent pileups in the event local interruptions occur. Operation of the system is controlled by one man from a cab at the top of the Bradford-breaker support structure.

MINE LAYOUT: Provides for Flexibility, Concentration

As shown in the accompanying map of the workings at Viking, the early development has been done to provide

(1) maximum flexibility in selecting mining territories and (2) best possible opportunities for adjusting production rates. Development mains project into major quarters of the property, thus making it possible to achieve a marked increase in output on short notice by adding additional mining units to work from the existing development.

On the other hand, the operating advantages of concentration have not been overlooked by Viking management. All four mechanical units now in the mine are assigned to the workings tributary to the northwest angle entry. Seven unit crews are employed, four day shift and three night shift.

Major benefits of such concentration are:

1. Power-conversion equipment is used to best advantage. The four mining units, including loading machines, cutting machines, drills and related equipment, are supplied with DC power at 275 v by two 300-kw mercury-arc rectifiers, both installed in the angle entry.

The only other converter in use at the mine is a 300-kw m-g set on the surface, which assumes part of the main-haulage load.

2. Haulage control is simplified and trackage is a minimum, thus contributing to low service-labor requirements.

3. Machine-maintenance efforts can be concentrated within a relatively small section of the mine. This is reflected in quicker response to calls for emergency service and consequently increased operating time.

4. Transportation of men and supplies is faster and simpler.

5. Highest efficiency is achieved in the propulsion and coursing of ventilating air and in the distribution of compressed air for coal breaking.

As shown in the map, the use of an angle entry provides numerous working panels, which is an indication that Viking management prefers to develop and recover a panel with a single mechanical unit. This preference is based in the fact that when two units have been employed in a single panel, the shuttle cars lost too much time at the panel belt waiting for space on the belt in which to discharge their coal. Each unit is equipped with two shuttle cars. Working individual panels, two units will produce as many as 20 shuttle-car loads per shift more than if both work in the same panel. Therefore, the necessary additional panel belt is a worthwhile investment.

HARLAN CRIST (left), president, Viking local, receives UMWA 100% training award from Robert Anderson, president, UMWA District 11. Others attending ceremony are Louis Austin, board member; Charles Ferguson, UMWA director of safety; Ralph Day, secretary-treasurer, and Walter Gorby, vice president, District 11.

Co-operating Mineworkers, Officials Earn Safety Award

BIRCH BROOKS (right), vice president and general manager, Viking Coal Corp., sees James Westfield, USBM, present certificate for 100% completion of training to Colvin Burk, chief engineer in charge of Viking mine. Charles Andrew, mine foreman, and Stewart Johnson (left), superintendent, look on.

PERSONNEL: 13-Man Crews, 350 Tons per Unit Shift

The Indiana No. 5 seam averages about 4 ft in thickness. The immediate overlying strata include about 3 ft of black slate containing pyritic boulders over the coal and extending down into the coal seam, and from 2 to 4 ft of sandy shale above the slate. The bottom is fireclay, varying from 10 to 24 in in thickness.

The property lies west of the Wabash River, but portions of the seam immediately along the river have been difficult to mine because of bad roof conditions and excessive water as the outcrop near the river cut is approached. The east limit of the active workings therefore is about 1,000 ft west of and generally parallel to the river.

The distribution of mining units at the time the mine was visited included a unit on development of the angle entries working both shifts, and

three units in room panels on the first shift and two on the second shift. A third-shift maintenance crew completes necessary deadwork, loads rock, distributes rock dust and prepares some coal for first-shift loading.

Mechanical equipment for each unit includes a loading machine (14-BU), a cutting machine (11-RU), two shuttle cars (6-SC), and a shop-made drilling unit consisting of a pair of CP-580 coal drills which are supported on booms attached to a T-2 truck. The booms rotate laterally about a pivot at the truck, and may be raised or lowered by means of hand-operated hydraulic jacks. The Armstrong coal-breaking system is in use, using a pressure of 12,500 psi at the compressors. Carboloy CC-3 bits are used in undercutting and molesfoot bits with throwaway inserts are used in drilling the 3⅛-in holes for air-breaking shells. The cuts are about 8½ ft deep.

A unit crew is made up of 13 men, including a loading-machine operator, two men on the cutting machine, two on the coal drill, two shuttle-car operators, a coal-breaker, a man at the belt head, an electrician, a bratticeman, a timberman and the foreman. Average production for a unit and crew is 350 tons per shift from the 4-ft seam, and the mine record for a day's operation is 2,959 tons.

Three two-man roof-bolting crews also are employed on each production shift. Two use Fletcher roof-bolting machines equipped with the Hydroslide drill-positioning attachment and the other uses a Joy roof-bolting machine.

MINING METHODS:
At the Face, and Outby . . .

All entries are 14 ft wide on 35-ft centers, and rooms are 22 ft wide on 35-ft centers. Main entries consist of six headings to provide the necessary ventilating area and sufficient working places for development units. Panel entries consist of five parallel headings, additional working places being provided in the rooms which are worked along one side of the panel as the entry is advanced.

The rooms on the return-air side of the panel are driven on the advance to insure that the active faces during panel-retreat operations will have first use of fresh intake air. The best unit-production records are made in the panels in those shifts when the advancing entry and adjacent rooms are being worked. Then equipment tramming is at a minimum and haulage distance is reasonable.

The panel belt conveyor is installed in the center heading. Roof support in the belt heading consists of a row of posts on 4-ft centers each side of the belt and roof bolts where necessary. The bolts are ¾ in in diameter. Ohio Brass bail-type expansion shells with Pal nuts are used to create anchorage in the roof. Bolting crews discovered that without Pal nuts in place under the expansion shell the fittings sometimes pulled down through softer roof material without taking hold.

Bolts used in rooms and panel entries are 42 in long, and those used in mains are 48 in long. The mains are bolted throughout in the face cycle on a 4x4-ft pattern. The unit timberman sets the necessary posts and takes down top coal which refuses to fall away with the cut, because of the uneven roof.

Transportation and ventilating clearance is provided by taking up the fireclay in the center panel heading and in the two center and two outside headings in the mains. A special skiving blade is attached to the loading head of the Joy to cut under the clay and force it up to the gathering arms. The blade essentially is a hard-faced extension of the loading-head edge and is held in place by chains. The clay is loaded into shuttle cars and gobbed in worked-out panels, or brought to the surface on the second shift.

Rolling stock for the haulage system includes 120 Sanford-Day drop-bottom cars, 60 of 3½-ton capacity and 60 of 5-ton capacity. Three 8-ton General Electric and four 8-ton Goodman locomotives now provide traction power, although a 13-ton General Electric unit now is being rebuilt for mainline service.

The mine cars all have similar basic dimensions, but the lower-capacity units, lacking sideboards, are used in development openings where the shuttle cars load directly into the mine cars. The larger cars, with sideboards in place, are loaded at panel-belt discharge points.

Power is transmitted to the property at 66,000 v, AC, and stepped down to 2,300 v for distribution to the conversion units. Face equipment and underground belt conveyors operate at 275 v, DC, which is distributed to the active sections in 6/0 trolley wire and a parallel 1,000,000-cir mil feeder. Surface belts, including the slope belt, and the reclaiming belt which transports night-shift coal from the 2,000-ton underground bin to the slope belt operate at 440 v, AC, since all are interlocked with the power company's coal-handling system.

Men and officials at Viking take just pride in their safety performance also. Co-winners in last year's "Turkey Derby," a competitive safety program among Indiana's shaft mines sponsored by Lynch Coal Operators' Reciprocal Association, each employee carried home his choice of a turkey or ham at Christmas. The record showed production of 56,470 tons per compensable accident in 1954, and total production of about 1,500,000 tons since the mine was opened without a fatality.

The mine was the first in Indiana to attain 100% completion of an accident-prevention course supervised by the U.S. Bureau of Mines. This course was completed in June, 1954.

New Bearing Plate Shows Roof-Bolt Tension

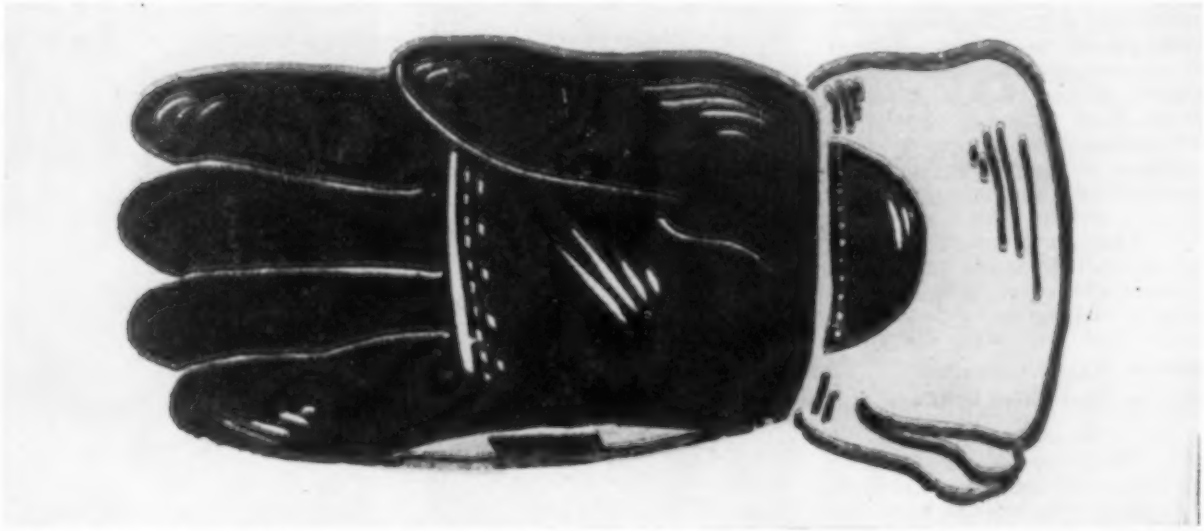
A "RUBBER-IN-STEEL SANDWICH," used as a roof bearing plate with any conventional roof bolt, gives a ready indication of bolt tension in the increased dimensions of the rubber center as it is squeezed out from between the steel plates under pressure. A cooperative development of the U. S. Bureau of Mines and the Goodyear Tire & Rubber Co., the unit consists of two steel disks, 5 in in diameter and ⅜ in thick, with a ⅜-in layer of rubber vulcanized between them. Two USBM scientists hit upon the idea.

Bolt tension usually is determined with a torque wrench, but this method is not accurate enough for control work, and torque-wrench readings may be misleading in instances where the nut digs into the bearing plate or where threads are damaged. With the rubber-in-steel plate, however, accurate, rapid and repeated bolt-load determinations may be made merely by measuring the lateral expansion of the rubber with a calibrated gage as the unit is compressed.

An inexpensive gage for measuring the increase in circumference of the rubber has been developed. Laboratory and field tests have shown that the device is sufficiently accurate for all practical purposes.

The Bureau's roof-control experts are convinced that frequent use of the compression pads in bolting patterns will result in more uniform and more effective roof-bolt installations, and consequently in reduced risk of failure.

It is expected that compression plates of this type will be generally available soon.

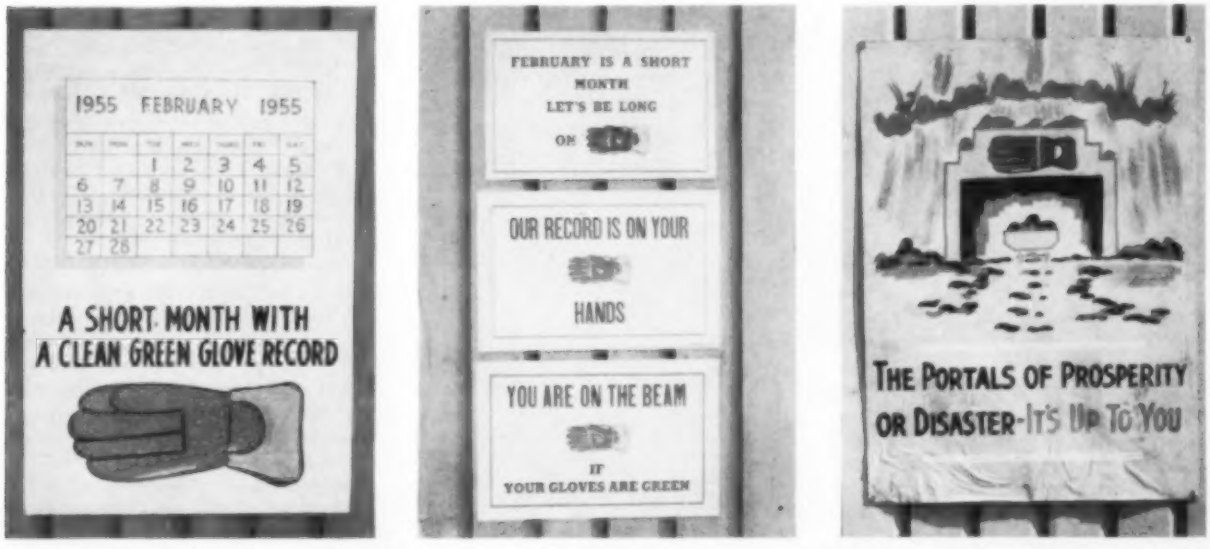


POSTERS bearing only the campaign symbol, with no other explanation, were interest-building kickoff in new accident-prevention program based on . . .

Green Gloves for Safety

How new approach designed to create interest and provide incentive has resulted in a major improvement in the safety records at the coal mines of the Semet-Solvay Div., Allied Chemical & Dye Corp.

AN IMMEDIATE DROP in the number of lost-time accidents at the Tralee and Harewood (W. Va.) coal mines of the Semet-Solvay Div., Allied Chemical & Dye Corp. followed the adoption of a new approach to the problem of safety. This was the so-called "Green Gloves" program, which went into effect in August, 1953. During 1954, the first full year of the program, the lost-time frequency rate at Tralee and Harewood mines was reduced 48 and 50%, respectively, compared to the experience in 1952, the last full year before the initiation of the program. Both mines are large operations with modern preparation plants. Tralee and Harewood together normally produce close to 2,500,000 tons of clean coal per year, and in the process load, separate out and dis-



GREEN-GLOVE THEME runs through all posters, which are changed once a month. Large 24x36 posters are used outside and at points where numbers of men congregate. Smaller 11x17 posters (center) are used in working sections. Poster at right was based on suggestion by chairman of Tralee mine safety committee.

pose of close to 2,000,000 tons of rock.

Providing a tangible incentive for working safely and for insisting that fellow workers do the same was the goal in the new program. A pair of green-colored all-leather work gloves with yellow trim is given to each workman and section foreman each month the crew is not charged with a lost-time accident. Green gloves pictures dominate all safety posters in and about the mines. These are changed each month to keep up interest in the program.

GREEN GLOVES: Interest Revivers, Incentive Builders

Before "Green Gloves," the Semet-Solvay Div. made use of practically all the accepted safety practices of the industry. A safety inspector spent most of his time underground. Safety bulletins were widely distributed, regular safety meetings were held, and, in the sections, men and foremen met to discuss accidents. First-aid training was given and by the time the green gloves program started, "C" mine of the Harewood operation had completed training 100%, and the Eagle mine, also of Harewood, had reached 90%.

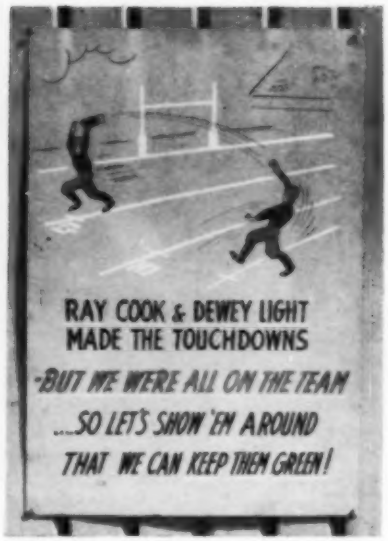
Comparatively speaking the safety records were good but not nearly as good as the Division officials thought they should be. Something seemed to be lacking and the conclusion was that it was "A tangible incentive and suggestive program to inspire men to better and more cooperative work habits."

Percy Gillie, general manager of coal mines, suggested the awarding of green gloves and assigned to Ralph H. Ratliff, assistant general manager, the inauguration of the program. O. E. Easterling, Tralee superintendent; C. V. Hunt, Harewood superintendent; and Joe Mulligan, safety inspector, were delegated to carry out the program.

In the new approach, the aim was to avoid the use of all common words, phrases and slogans that have been used over and over in safety campaigns. Even the word "safety" and the term "lost-time accident" have not been used on the many large and small posters that remind the men of the green gloves awards.

Although considered "lost-time accidents" for statistical purposes, certain accidents are termed "no lost time" for the purpose of green gloves awards. Such an accident is one in which the employee either returns to work at the beginning of the next regular shift or reports to the doctor on that day and returns to work on the following shift. This permits employees working on off shifts and at back portals to secure medical attention. The free day is allowed in fairness to men who live off the job (some drive as much as 50 mi to work) and to men working odd shifts who need a chance to see the doctor before reporting back to work.

The mine superintendent maintains close contact with the local doctor to assure himself that if the injured employee is absent on his next regular shift it is a result of securing medical attention. The green gloves plan includes all employees except store, office and engineering force.



ADDED INCENTIVE IN 1954 was a drawing for TV sets. Special posters were designed to whip up interest in advance and capitalize on it afterward.

REAL TEAM MAN is George J. Elliott, boom man, Harewood, who, by special effort, finished his night shift after an injury necessitated a trip to the doctor.

A section is defined as a group of men working under the direct supervision of a foreman. Men not engaged in the mine sections are grouped as far as possible so that the size of the group will be approximately the same as a mine section group. General inside labor is grouped under the general mine foreman, and the shop and preparation plant forces under the master mechanic.

GLOVES IN ACTION: Kickoff and Follow-Through

The first step in getting the program going was to have a local sign painter prepare a number of 24x36-in posters carrying only a large colored picture of a green glove—no legend or other printing. A representative from the Division operating office at Bluefield, W. Va., posted these in prominent places around the mines, such as, the portals, office windows and other points where men normally congregate. Even the superintendents of the mines were not informed at first as to the purpose of the posters.

After about 3 wk, during which time all kinds of rumors went around as to their meaning, the superintendents and the mine inspector were called together, the program was explained and complete sets of instructions were issued. Each mine superintendent then called a meeting of all supervisors to explain the terms on which green gloves would be awarded. Next the mine safety committees were asked for suggestions. Many good ones were received and acted upon. As the final step in inaugurating the program, the section

TV SET WINNERS were Ray Cook, loading-machine helper, Tralee mine (left), and Dewey Light, mechanic at Harewood.

foremen set aside the last 15 min of a shift to meet with their men, discuss the program verbally, and answer questions.

To pave the way for issuance of the gloves each section foreman, at the end of each month, sends to the office a list of all men working on his section. On about the 4th day of the following month, pairs of green gloves are passed out to the foremen heading the no-lost-time-accident groups, and the foremen distribute them to their men. Eligible foremen also receive gloves of their own.

On the day the gloves are handed out new green-glove posters are placed in and about the mines to remain up until the next month. Large 24 x 36-in posters are placed on the outside and at permanent points where men congregate. Small 11x17-in posters are placed in the sections. Every poster carries a green glove in color and each month the brief message on the poster is entirely different from the previous month. The words "safety" and "accident" do not appear.

The wordings of some of the posters not included in the illustrations accompanying this article are as follows:

"My Daddy Says Men Who Care Always Wear Green Gloves"

"When I Dress For Work I Wear Hard Toe Shoes And Green Gloves"

"Ray Cook and Dewey Light Made The Touchdowns But We're All On The Team, So Let's Show 'Em Around That We Can Keep Them Green"

"In Order To Get Your Name In The Pot You Must Wear Green Gloves Around The Lot"

The chairman of the safety committee at Tralee mine suggested the green glove poster featuring a mine portal and bearing the slogan, "The Portals Of Prosperity Or Disaster—It's Up To You."

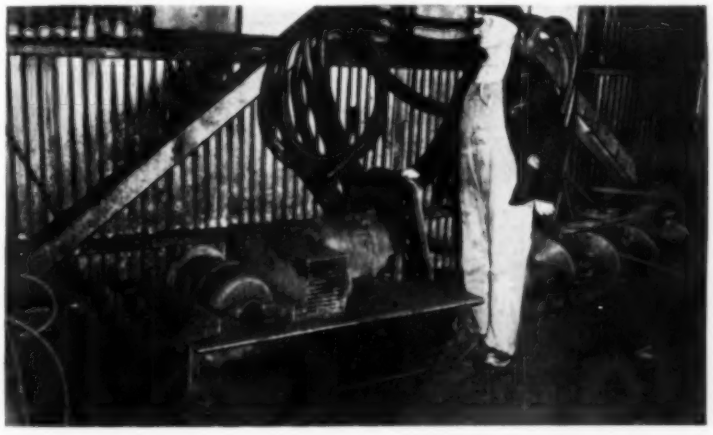
GLOVES RESULTS: *Safety Personally and for Others*

To step up interest in the green-gloves program the company decided to award one television set at each mine last summer. The men eligible to draw for the set had to win green gloves successively for the months of July, August and September. Section foremen were not eligible. Ray Cook, loading-machine helper, won the set at Tralee, and Dewey Light, mine mechanic, won the set at Harewood.

As one result of the green-gloves program, there have been many instances where a man made a special effort to get back to work after an accident, apparently mindful of the green gloves and of the desire of the other men in his section to win them. As an example, George J. Elliott, boom man in "C" mine, Harewood, injured his hand Aug. 18, 1953, at 10 pm. Section Foreman Lewis C. Coleman took him to Dr. J. C. Doboy, plant physician, who in turn took him to the hospital. Mr. Elliott wanted to get back to work on the same shift. Dr. Doboy pronounced it safe for him to do so and gave him $2 for taxi fare back to the mine to finish his shift.

The green-gloves campaign has been especially helpful in stimulating men to take special interest in seeing that the other fellow works safely, and also, if he should suffer an injury, that he gets back to work with not more than one day lost so that there will be no count against the section. A man cannot return to work unless the doctor permits.

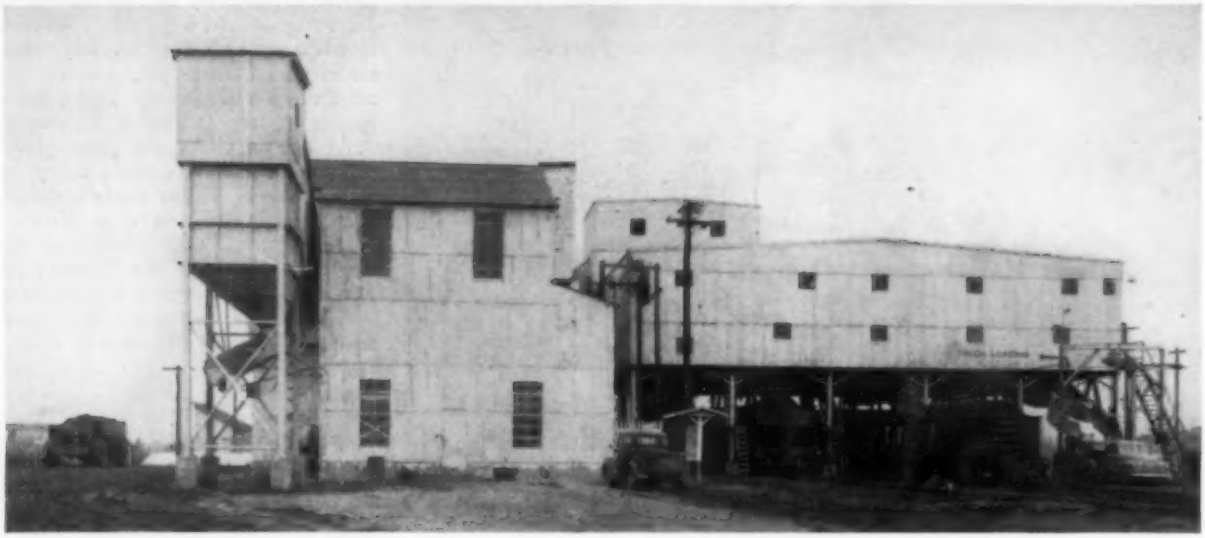
Through January, 1954, 8,860 pairs of green gloves had been awarded at Harewood and 8,397 at Tralee. Semet-Solvay mine officials are convinced that the green-gloves program has done a job.



Hoist Saves Labor in Preparation Plant

EASIER AND FASTER handling of heavy parts in the preparation plant of The Colonial Coal Mining Co., Madisonville, Ky., has been made possible with this compact hoist. Luke Shoulders, preparation foreman, shown at the controls, designed the unit.

Colonial has a company-designed elevator to handle supplies between floors but heavy parts frequently must be handled at the various units. This is now done easily with the aid of the hoist rope and strategically placed pulleys. The hoist is located so that parts also can be handled between various levels of the plant if desired.

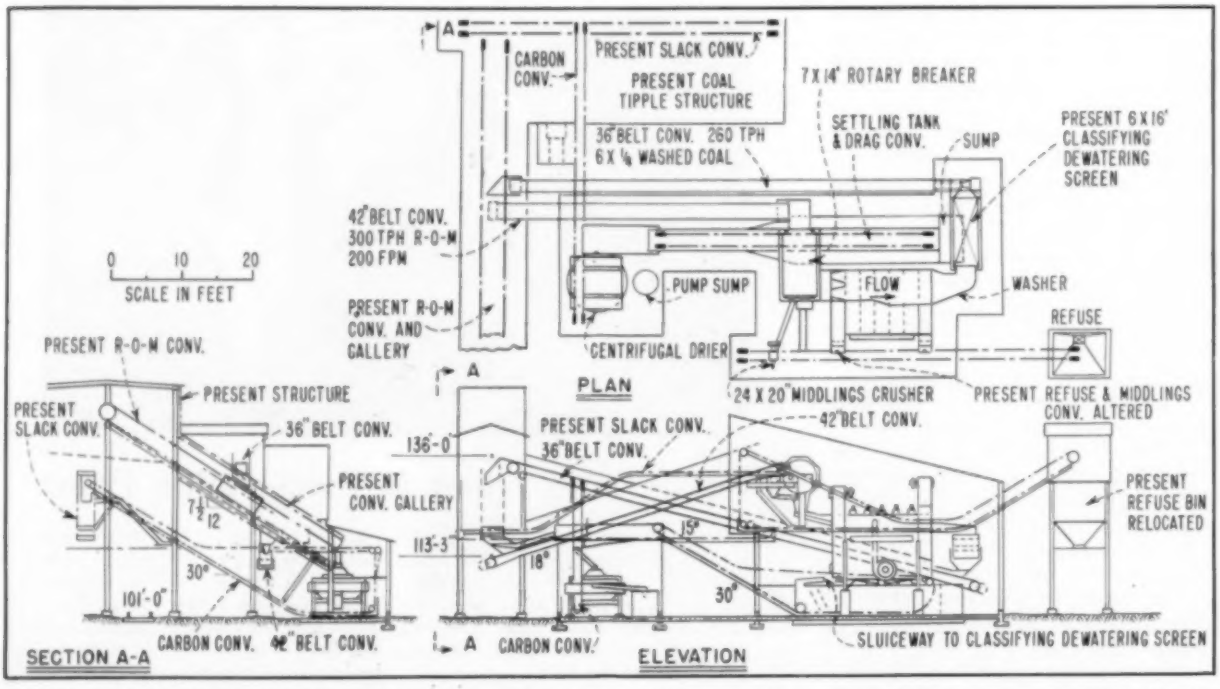


SUNSPOT WASHERY, equipped with rebuilt units, provides for fullest realization from remaining coal reserves.

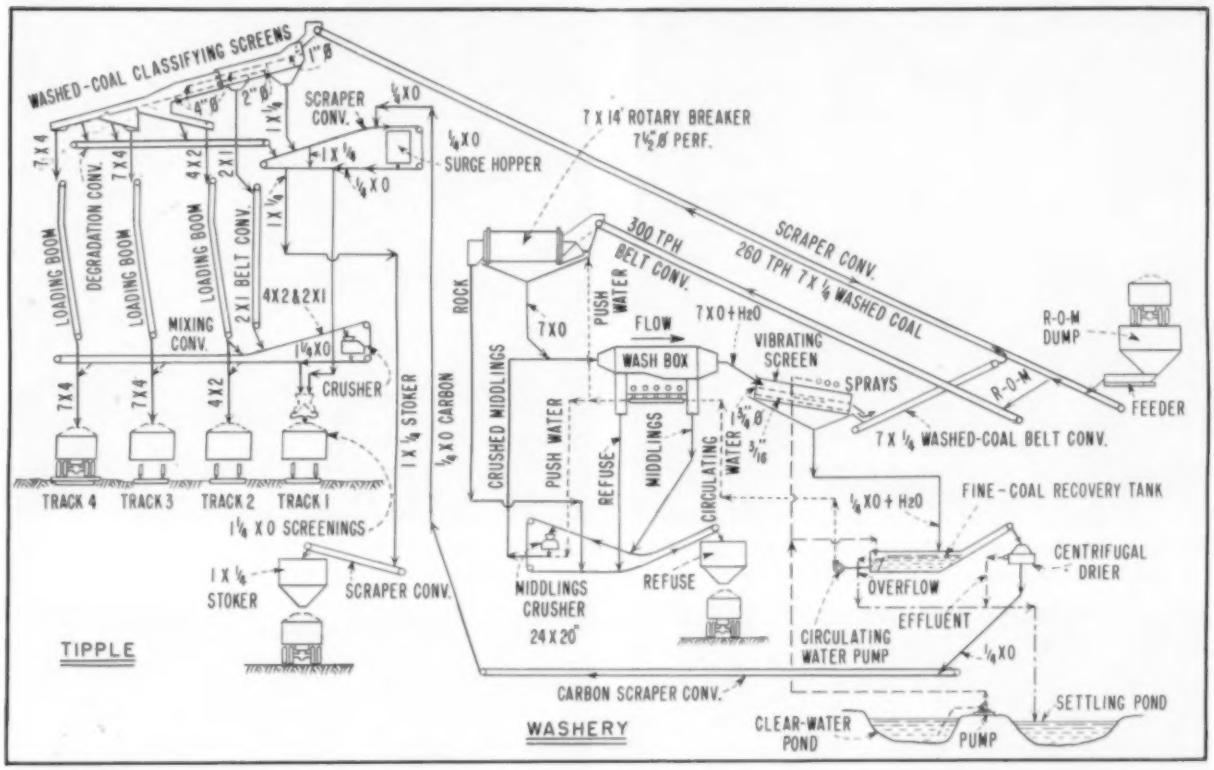
Washery Design Cuts Costs

To provide a top-quality product, while holding down initial investment and operating costs at its Sunspot mine, Ayrshire Collieries designed washing facilities to use rebuilt units, fabricated structural steel on the job and capitalized fully on the existing tipple.

QUALITY IMPROVEMENT and low installation and operating costs were twin goals of the Ayrshire Collieries Corp. in preparation improvements at Sunspot mine, near Clinton, Ind. In addition to the desirability of enhancing the market acceptance of the coal, a major factor in the development of the plant was limited coal reserves,



LAYOUT OF NEW FACILITY provides for most efficient handling of washery flow with least rearrangement of tipple.



TWO MEN in washery, two more in tipple and three others handling cars work single operating shift at Sunspot preparation center. Addition of washer and simplification of circuits eliminates need for hand-pickers and extra pit-helper.

making it necessary to keep costs to a minimum so that these reserves might be mined economically with profit both to the company and to the consumer.

The trick was worked by installing a washery, but not at the price you'd think. The equipment consists of units which had been stored at other Ayrshire properties and a few items which were purchased from other companies. The primary units are a McNally-Norton washbox, a CMI drier, a rotary breaker and the associated conveyors and vibrators. All were restored to top condition before being installed at Sunspot.

The 350-tph plant is a result of cooperative engineering among Ayrshire's preparation officials, headed by J. W. McDivitt, preparation manager, and the engineers of Templeton-Matthews Corp., Terre Haute, who designed the washery to tie into an existing sizing and loading plant.

Previously, Sunspot practice included hand-picking of the raw coal after sizing. Quality of the picked lump coal, therefore, was not a problem, but the unwashed smaller sizes could not compete in certain markets. The washery improves that situation by up-grading, analytically, the minus 1¼-in No. 6-seam coal as shown in these figures:

	Run-of-Mine	Washed
(As-Received Basis)		
Moisture, per cent	11.3	14.1
Ash, per cent	12.5	7.2
Sulfur, per cent	2.7	2.1
Btu	10,910	11,330
Fusion, deg F	2,100	2,240
(Dry Basis)		
Ash, per cent	14.1	8.4
Sulfur, per cent	3.1	2.4
Btu	12,300	13,190

DESIGNING FOR ECONOMY

Some of the more helpful economies are:

Structural steel was fabricated on the job. The H-beam stock, 90% new, was unloaded at the site, cut to required length by torches and welded into the structure, according to working drawings prepared by Templeton-Matthews.

Skills of Ayrshire's employees were fully utilized in putting up an all-welded structure, using the company's welding equipment.

Conveyors and other usable units in the existing tipple were relocated or modified to serve an added function in the washery wherever possible.

It was found to be less expensive in many instances to make the required settling tank, chutes and so on right on the job out of standard steel plate.

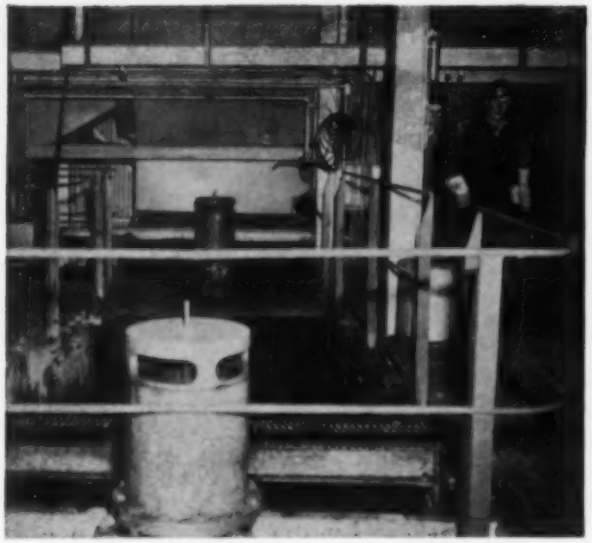
Even the man-hours required to gather equipment at Sunspot were considered. For example, of several washboxes available, one was finally chosen because its location in its original plant made it easiest to remove and load, other factors balancing.

The position of the washery with respect to the existing sizing and loading plant is indicated in the accompanying drawings. The refuse bin had to be relocated to permit building the washery here to take advantage of the feeding facilities already in operation. The washery-feed conveyor receives raw coal from the original scraper conveyor, and the clean-coal conveyor from the washery returns the product to the same scraper conveyor at a higher elevation. The original purpose of the scraper conveyor was to raise the run-of-mine from the truck hopper directly up to the sizing shaker at the top of the older plant.

Other major relocations are:

The refuse conveyor was taken from its position underneath the picking tables and reinstalled in the washery to serve the double purpose of removing refuse and transporting middlings from the washbox elevator to a 24x20-in Flextooth crusher for reduction and recirculation.

The carbon conveyor, which trans-

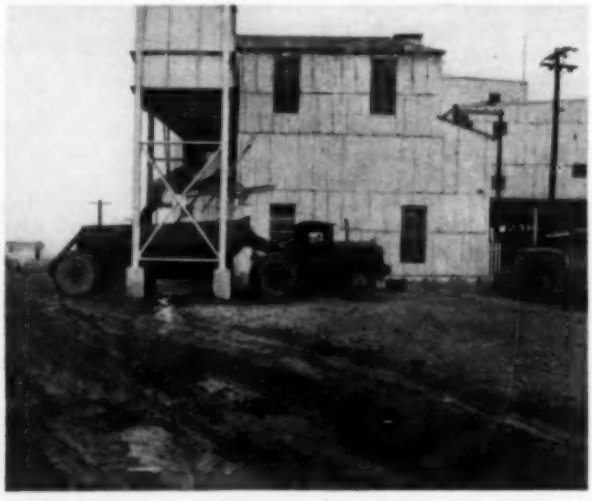


BAUM-TYPE WASHBOX receives up to 350 tph of 7x0 feed, including middlings and rough-cleaned coal.

CLEAN COAL is returned to tipple-feed conveyor on 30-in belt. A 42-in belt removes raw coal from feed conveyor.

DEWATERING-CLASSIFYING SCREEN separates ¼x0 out of washbox product for thickening and final dewatering.

SETTLING TANK and drag conveyor were constructed on the job out of steel plate by Ayrshire welders.



BOTTOM-DUMP COAL HAULER discharges 25-ton load of strip-mined coal into feed hopper of washery and tipple (left photo), then takes on load of washery refuse at elevated bin (right) for disposal in the pit.

ports ¼x0 from the centrifugal drier to the slack conveyor, is made up of parts salvaged from scraper conveyors formerly required in the sizing plant for recirculating crushed coal. Simplification of the sizing circuits released such conveyors for the new application.

The belt conveyor which carries the 2x1-in coal from the main shaker to the mixing conveyor formerly was installed above the main shaker to return crushed lump coal to the top of the shaker.

Construction of the washery was begun June 15, 1954, and the first coal was loaded 3 mo later, on Sept. 16.

HOW THE COAL IS CLEANED

Raw coal is hauled from the Sunspot pit by four 25-ton, bottom-dump Euclid coal haulers which discharge into a drive-over hopper. A single reciprocating feeder moves the coal out of the hopper into the 60-in drag conveyor as the first step in the cleaning process. Part way up, the gallery and drag-conveyor pan have been opened up to provide a feed chute to serve the 42-in washery-feed belt conveyor.

This feed conveyor discharges at the top of the washing circuit onto a 4-in bar screen, from which the overproduct passes through a 7x14-ft Bradford breaker and the underproduct by-passes the breaker and is sluiced directly to the washbox. The minus 7-in product of the breaker joins the minus 4-in underproduct of the bar screen in the sluiceway to the washbox.

The 7x0 clean coal from the washbox is chuted to a 6x16-ft Ripl-Flo screen having a top deck fitted with 1¼-in-square mesh and the bottom deck with ¼-in-square mesh. Overproducts of both decks, 7x¼-in clean coal, are discharged to a 36-in washed-coal belt conveyor which returns the washery product to the drag conveyor above the place where the raw coal is removed. The drag conveyor then discharges onto the head of the main sizing shaker in the older plant.

The minus ¼-in underflow of the Ripl-Flo is dropped into a 42x11-ft settling tank for thickening ahead of the 48-in CMI drier. The product of the drier, minus ¼-in carbon, is transported in the carbon conveyor to the slack conveyor in the tipple for loading with 1¼x¼, as desired.

CONTROLLING CASH OUTLAY

The two belt conveyors, carrying R-O-M and washed coal, and the washbox were purchased at a closed preparation plant in Illinois. The CMI unit, a vibrating screen and the pumps are contributions from Ayrshire's Minnehaha mine, and the Ripl-Flo and Bradford breaker came from Ayrshire No. 1 mine. Piping was collected from several sources, while the siding for the building formerly covered an Ayrshire No. 1 plant. Electric motors (384.5 hp in the washery) are surplus units from Ayrshire's warehouses.

The water circuit is relatively simple, with circulating water for the jig circuit coming from a sump at the settling tank through a 10x12-in Allis-Chalmers slurry pump, and make-up water coming from a fresh water pond through a 5x4-in pump. Effluent from the plant, including the overflow of the settling tank and water from the CMI, is conducted to a settling pond through a 12-in tile drain. Clarified water from the settling pond flows over into the clear-water pond to be recirculated as make-up water.

The washery is operated by two men, an operator and an oiler. The older plant also employs an operator and an oiler, and three ground men handle railroad cars and other duties about the plant. One maintenance man works the second shift.

Before the washery went on the line, the labor of 10 other men was required, nine at the picking tables and one at the pit.

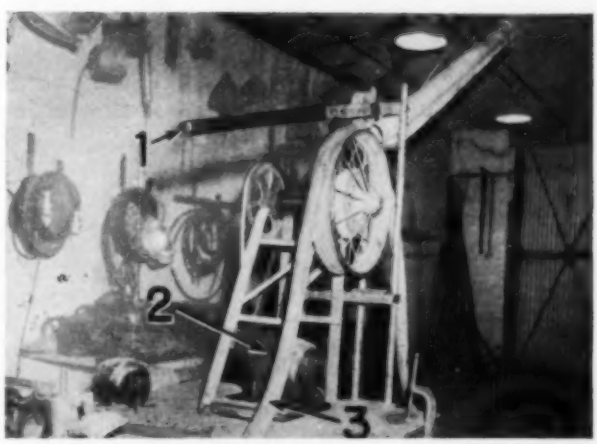
Mr. McDivitt, Ayrshire's preparation manager, and J. J. Merle, assistant preparation manager, co-ordinated all phases of the work. Ralph Westfall directly supervised all fabrication and construction. Pearl Allison is superintendent at Sunspot, and Simon Turchi is preparation superintendent.

How a Motorized Cable Hauler Helps Electricians at Shen-Penn

FRED PEARSON, electrical superintendent, and his crew at Shen-Penn Production Co., Shenandoah, Pa., have "done it again" with another idea for taking the drudgery out of a day's work. This time it's a motorized cable hauler for handling the heavy trailing cables in the shop. As shown in the illustration, the unit is made of spare parts from a number of sources, including a wheel from a Model A Ford, a ¾-hp gearmotor, a couple of V-belt pulleys from truck engines, a pick handle, a length of flexible exhaust tubing and a few other sundries.

The gearmotor turns the Model A wheel through a V-belt drive. The drop-center rim of the wheel is covered with friction tape to provide a better grip between the wheel and the cable jacket. Final friction, which insures that the wheel does not slip under the heavy cable, is provided by tightening down on top of the cable with a small pulley from a slope-rope guide. The pick handle is the lever for tightening the friction pulley.

The unit is used to pull cables across the splicing bench in Shen-Penn's shop, a job which formerly required hard work from the shop force in pulling and tugging by hand. Usually the cable piles up on the floor as it leaves the motorized hauler, as shown. But it can be loaded into a truck for direct return to the field by running the leading end up through the flexible exhaust tubing as it leaves the hauler.



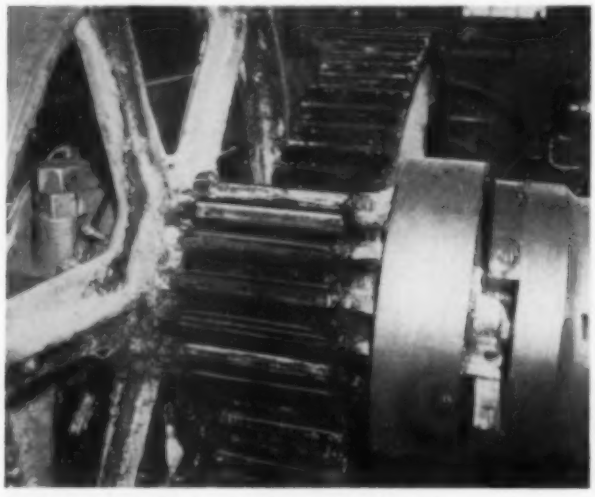
PRESSURE on the handle (1) while the motor (2) turns the auto wheel, causes cable (3) to be hauled into shop.

The gearmotor also is used to drive a cable reel through a rope belt in those instances where it is desired to place cable on a reel.

In addition to making the work at the shop easier, the motorized hauler also speeds up the splicing operation and permits faster delivery of repaired cables to the job.

Two-Way Responsibility for Efficiency . . .

RALPH R. HOUK, general superintendent, Big Bend Collieries, expects a good day's work from machine operators. Therefore, he holds himself responsible for maintaining good working conditions in which the operators can do their best.



SPECIAL WALKING PINION, at 10% higher cost, promises longer life and fewer mechanical delays.

SISTER SHEAVE on boom prevents damage from whipping hoist rope, which on occasion snaps tubular members.

BUCKET SHOULD LOAD in traveling three times its own length if overburden is properly prepared.

BRAZIL BLOCK COAL is loaded out of pit, exposing fireclay which is recovered for brick manufacturing.

Efficient Three-Product Stripping

High-quality domestic coal, terra-cotta clay and lime shales are recovered by Big Bend Collieries, Inc., Brazil, Ind., using a 12-cu yd dragline specially serviced for steady operation.

THE METRONOME OF OPERATIONS at the Brazil, Ind., workings of Big Bend Collieries, Inc., is a 12-cu yd dragline ticking off 1,000 productive swings per day, give or take 5% of this target figure. In removing overburden to expose a cement-grade lime shale, a seam of premium coal and a layer of commercial-grade fireclay, the large unit becomes the efficiency-maker for the entire operation since steady operation of the stripping unit virtually eliminates enforced idleness among the auxiliary machines and their operators.

Top officers at Big Bend are Milton Goodman, president, and E. E. Munger, vice president, who also are partners in Goodman-Munger Coal Sales Co., Chicago. Field operations are in charge of Ralph R. Houk, general superintendent, who points out that such steady operation of major units may be achieved through the following:

1. Know the facts relating to the operation of the machine. Learn the extent of down time and the cause of such outages. Big Bend employs an operations recording machine on the dragline in gathering these facts.

2. Head off trouble by making changes to eliminate the causes of recurrent delays. Slight modifications at Big Bend have resulted in marked increases in efficiency.

3. Provide working conditions – a direct responsibility of management – in which the equipment operators can work their machines at rated capacity without undue strain on themselves or the machines.

GETTING THE FACTS

The Bucyrus-Monigham 9-W dragline is equipped with an Esterline recorder which makes an inked record of each swing of the machine, showing the arc and time. Anyone familiar with dragline operations may read from the record exactly what the machine was doing at any given time. The length of each delay shows up in the record, and the operator or the oiler completes the fact file by writing on the chart the cause of the delay.

The pen of the recorder is moved through mechanical linkage with an actuating rack on the stationary center pin of the machine. After each move the oiler centers the pen on the chart while the dragline is in the loading position, thus providing a common basis for comparison.

The big advantage attributable to the use of the operations recorder, Mr. Houk says, is that neither he, as management, nor the operator can fool each other. Both must toe the mark because the faults of both will be plainly written on the operations diagram. For example, the operator cannot be held responsible for low production if the diagram shows that hard digging was the cause of the trouble. Management, Mr. Houk believes, had better look into the overburden-preparation methods at times like this.

HEADING OFF TROUBLES

Having identified recurrent delays from the operations diagram or by other means, it is likely that some change in design or operating methods can be worked out to eliminate the trouble. Here are some Big Bend examples:

Boom damage—On several occasions it became necessary to lower the 170-ft boom to the ground to replace some of the tubular members in the structure that had been broken by blows from the flailing hoist rope. The remedy for this consists of a sister-sheave assembly which was built in the company shops and is mounted on the boom, as shown in an accompanying illustration, to control the hoist rope. It is not even necessary to pad the boom with old tires.

Mechanical Breakdown—The walking pinions of the 560-ton machine were a source of trouble when the machine first went to work, and each such breakdown resulted in a costly delay. The answer to this problem was provided by Tool Steel Gear & Pinion Co. in the form of a heat-treated unit of special composition which costs 10% more but lasts twice as long.

Rope Maintenance – There is no way of eliminating rope changes, but down time can be minimized. At Big Bend, rope changes are planned outages. The 2-in drag rope is cut and resocketed at the bucket twice at 5-day intervals, then turned end-for-end after 15 days. The rope is again resocketed at the bucket twice at 5-day intervals, then used to destruction. The system permits the work to be done according to a schedule, rather than having rope breaks occurring when the maintenance crew is engaged elsewhere. The 1¾-in hoist rope is turned end-for-end at 6-wk intervals.

Bucket Economy – The two lightweight 12-yd Hendrix buckets now in use were purchased in the Fall of 1946 to replace 10-yd conventional buckets. After years of service the buckets still are in good condition because they are overhauled on schedule and are properly used by the operators. Teeth are turned every 5 days. The rule is that buckets should be filled in dragging them three times their own length. If a longer drag is necessary, overburden preparation is not what it should be and steps are taken to get better fragmentation. Difficult loading shows up in the operations diagram.

MANAGEMENT'S JOB

The other ingredient is a liberal portion of good management. Good equipment, good roads, intelligent operating methods and reasonably-comfortable working conditions are visible results of good management which are reflected in greater volumes of earth being moved.

Sometimes a little thing like a cab heater for a piece of equipment can result in a marked increase in output, Mr. Houk says, because a man can't do his best when he is physically uncomfortable. It is also a Big Bend rule that dragline operators may follow their performance on the data sheets

THREE-TRACK TIPPLE produces block and egg sizes and minus 2¼-in fines. Clay and shale are loaded into cars in foreground from nearby ramp.

BIG BEND SERVICE AREA is equipped to perform major repairs on all units.

prepared from the daily operations records.

HOW THE WORK IS DONE

The main product, premium domestic coal, is recovered from the 36-in Brazil Block seam which shows a striking cubical cleavage characteristic. The 18-in stratum of clay under the seam is a valued raw material for the manufacture of brick and ceramic building materials, a major industry of Brazil, and a 9-ft stratum of lime shale over the coal is suitable for the manufacture of cement. Total overburden, including the shale, is from 55 to 65 ft thick, averaging about 58 ft.

The clay and shale are sold to nearby manufacturers; the coal is sold through Goodman-Munger Coal Sales Co.

The high-capacity 9-W dragline now in use follows a 5-W which had opened the original pits 15 yr ago. The larger unit has ramped its way through the spoil left by the smaller unit to continue operations beyond the place where the smaller unit was forced out by the economics of the situation.

The stripper works 54-ft-wide cuts from the center toward the east and west boundaries of the 1,200-ft-wide tract. The usual practice is to have the stripping and loading functions in separate cuts to eliminate interference. However, the 2-yd Northwest 80-D loading shovel loads the overlying shale up close to the dragline, thus permitting the dragline to spoil immediately the remaining shale after orders have been filled.

Overburden is drilled by a two-man crew using a Parmanco horizontal drill. The 6-in holes are drilled from 14 to 18 ft apart, depending upon the nature of the material to be blasted. The holes are drilled in the shale about 2 ft above the coal. The charge consists of from 175 to 200 lb of Atlas explosives per hole.

Stemming is made up of drill cuttings in paper tamping bags. Proper tamping is highly important because the shale is greasy, and it may slip out, leaving the caprock unbroken, if the confinement of the charge is poorly done.

The dragline first removes surface material to provide a level working bench for itself. Then caprock and other material is removed down to the lime shale. Production averages 18,000 tons of coal, 6,000 tons of clay and 4,000 tons of shale per month. The loading shovel works 3 or 4 days per week on coal and the remainder of the time on the clay or shale. A stockpile of clay is maintained at the rail loading point to insure a supply of the material when loading in the pit is impossible.

HANDLING THE PRODUCTS

Big Bend maintains two screening and loading plants. The first was built to separate the plus 4½-in Block coal and the 4½x2¼ egg coal. The newer plant was built to size the resulting fines into 2¼x1-in nut, 1x$^{3}/_{16}$-in stoker and minus $^{3}/_{16}$-in carbon. Both tipples are served by the Pennsylvania R.R., and the fines are transferred from one plant to the other in railroad cars.

The haulage fleet handling the pit products includes four 10-ton Mack trucks and four 8-ton International K-11 trucks. Six trucks usually are active.

Stripping continues around the clock; loading is a single-shift operation. The working force at the pit includes 11 men for the dragline, an operator and ground man for the loading shovel, two coal cleaners, a bulldozer operator and a full-time pump man. One man is engaged in full-time maintenance of both company and county roads used by Big Bend trucks.

The maintenance crew, operating from well-equipped shops and a full stock of parts, includes two welders, two gasoline-engine mechanics, one diesel-engine mechanic and a stock clerk.

Supervisors are Charles F. Houk, pit superintendent; Ted Shanks, master mechanic; Clarence Dicks, chief electrician, and George James, office manager.

The facilities are widely separated. The shop area, for example, is 8 mi from the pit. The problem of communications has been solved through installation of a Motorola two-way radio system with sets in Ralph Houk's Dodge pick-up truck, the dragline, at the office and tipples and at the main shop. The extensive shop area is equipped with public-address lines.

The Coal Commentator

Paving the Way

Construction of the coal pipe line from Georgetown, Ohio, to Cleveland is expected to start within a few months.—George H. Love, president, Pittsburgh Consolidation Coal Co., to company stockholders, April 20.

"Increased reliance on competitive forces in rate-making constitutes the cornerstone of a modernized regulatory program. Recommendations contemplate revisions of four elements of current statutory provisions relating to: (a) maximum-minimum rate control; (b) suspension powers; (c) the long-and-short-haul clause (Sec. 4); and (d) volume freight rates."—Report of the Presidential Advisory Committee on Transport Policy, April 18.

Developments like these reflect the fact that short-sighted transportation policies—in part the carriers' fault and in part a result of tradition-bound and unrealistic regulation—are preventing the transportation progress necessary to match the present and future needs of shippers and consumers. But as a result of these and other developments, coal can begin to feel more hopeful—and every gain paves the way for greater yields from continued pressure for relief.

Table TPM

New evidence immediately to hand indicates that miners can hang up records in other directions than at the face. On April 20, Philip Yadzik, 42-yr-old 200-lb miner from Olyphant, Pa., put away 31 orders of fried chicken in 5 hr at a drive-in restaurant in Detroit. The day before, he cleaned up 77 hamburgers in Chicago. Contract rate for gustatorial tons per man? At Detroit,$150 plus $100 expense money, plus free chicken, plus 16 14-oz glasses of pop to wash things down.

Trepanning With Barslides

Aiming for 25 tons or better per man at the face in coal around 3½ ft under cover so thick that longwalling is necessary, the British now are experimenting with a new continuous-type machine—the A-B trepanner. Making a circular cut, with certain precutting and finish-cutting operations to prepare and trim up the face, the machine is pulled end-on along the face by a haulage chain, discharging the coal to a "snaking" conveyor alongside, this snaking conveyor discharging in turn to a mother belt. In the early experiments, the goal was to protect the face with bars that could be slid forward in special heads on mechanical props, plus mechanical and hydraulic chocks, permitting the roof to cave back of the chocks. The goal, as noted, is 25 tons or better at the face, and the British expect great things of the new unit—for example, ability to produce 6,300 tons per week of 11 machine-shifts, involving cutting and loading 20,000 ft of face length for an advance of 59 ft on a face 340 ft long.

Not All Black

"Since the majority of heating installations are made from May through September, industry leaders believe the first-quarter report is indicative of the biggest sales year in the history of the automatic hard-coal equipment business." Thus concludes a report on shipments of automatic anthracite heating equipment in the first quarter of 1954 issued by the Anthracite Institute May 11, showing that shipments by six leading manufacturers increased 29% compared to the first quarter of 1954, while March, 1955 sales, reached a rate 50% higher. This contrasts with a drop in total anthracite production of 7.7% in the first quarter of 1955, compared to 1954. Question: "Can it be assumed that there is nothing ahead for anthracite but a continued slide to lower and lower levels?" Answer: "Not necessarily. Opportunities for building business still remain and can be made to pay off. The picture is not all black."

Misguided Missiles

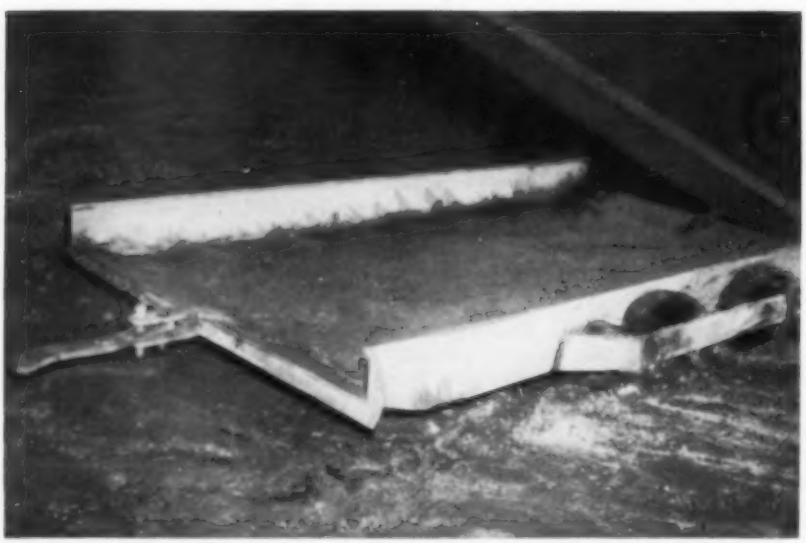
What are your chances of surviving the next 52 weekends in this age of motor vehicles? Or, if you do survive, what are your chances of doing so with a whole skin? They are better than fair, but the risk, nevertheless, is no small one. In 1954, weekend crashes accounted for 13,980 killed and 678,000 injured out of a total of 35,500 killed and 1,960,000 injured. Saturday remains the most dangerous day of the week to drive, even though 1954 was the first year since 1949 to see a decrease in the death toll.

Excessive speed was again the most dangerous driving mistake in 1954, killing 12,380 persons. Three out of four auto accidents happened to passenger cars operating in clear weather on dry roads, and 78% of the cars involved in fatal accidents were traveling straight ahead. These and other sobering facts are found in "Misguided Missiles," the 21st in an annual series of traffic-accident data booklets published by the Travelers Insurance Cos., Hartford, Conn. It's free as long as the supply lasts. Its contents really add meaning to that old injunction: "Drive carefully. The life you save may be your own."

CONVENIENT AND FAST, operating at 4.2 mph, tractor brings crew out from main-heading development in 31-in seam. When track is installed to handle men and supplies, the tractor-trailer will work inby to the face.

Handling Men and Supplies

How Red Jacket uses versatile 24-in battery tractor and 7x14-ft cars to move men and supplies in developing a 31-in seam with belt conveyor at Keen Mountain mine Buchanan County, Virginia.

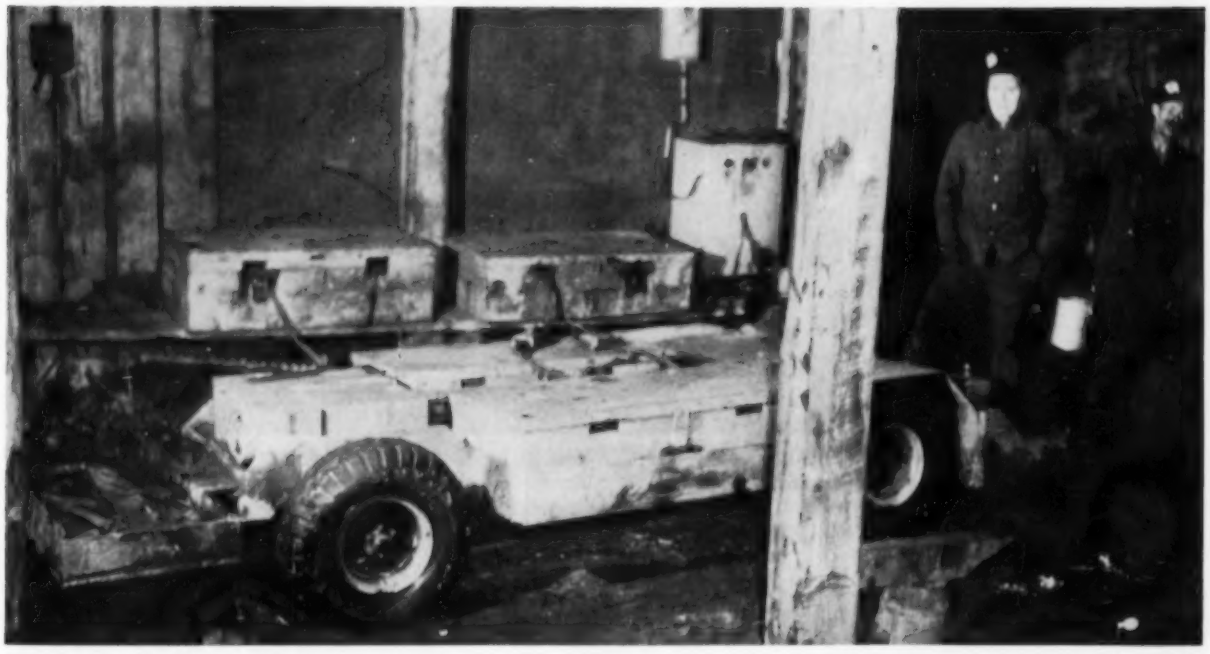


RUBBER-TIRED CAR designed to coal company requirements is 7x14 ft in dimensions, with sides 12 in high, and can haul 13 men in 31-in coal.

HAULING MEN AND SUPPLIES in a 31-in seam is being done with complete satisfaction by a battery-powered rubber-tired tractor and special rubber-tired cars at the Keen Mountain (Va.) mine of the Red Jacket Coal Corp. The tractor and one car carries an 11-man crew from the portal to the working section but could take a 13-man crew.

Keen Mountain mine was opened in 1937 in the Cary seam (*Coal Age*, April 1938, p 37). The coal is lowered from the headhouse (1,886 ft above sea level) to the preparation plant by a rope-and-button conveyor 1,242 ft long on a 24-deg pitch. In March, 1954, the Kennedy seam, 180 ft below the Cary, was opened by a belt conveyor discharging to an intermediate point on the existing rope-and-button conveyor. Present mining in the Kennedy seam is aimed at prospecting and developing a main entry for future expansion.

When the seven-heading entry had been driven 250 ft without taking any top or bottom, the problem of transporting men and materials had to be met. The solution was purchase of a Kersey Model 444-D tractor, an extra set of batteries, charging equipment, and two special man-and-material cars from the Kersey Mfg. Co., Bluefield,



PARKED BETWEEN SHIFTS, the tractor sits beside shelf holding extra battery in two trays and automatic selenium rectifier for charging. Tractor is only 24 in high and has a 4-wheel drive and steer.

With Low-Coal Tractor-Trailer

Va. The equipment went into service in July, 1954, when the entry had been extended to 300 ft. Since then the tractor and cars have handled all men and materials and the entry is now in 1,650 ft.

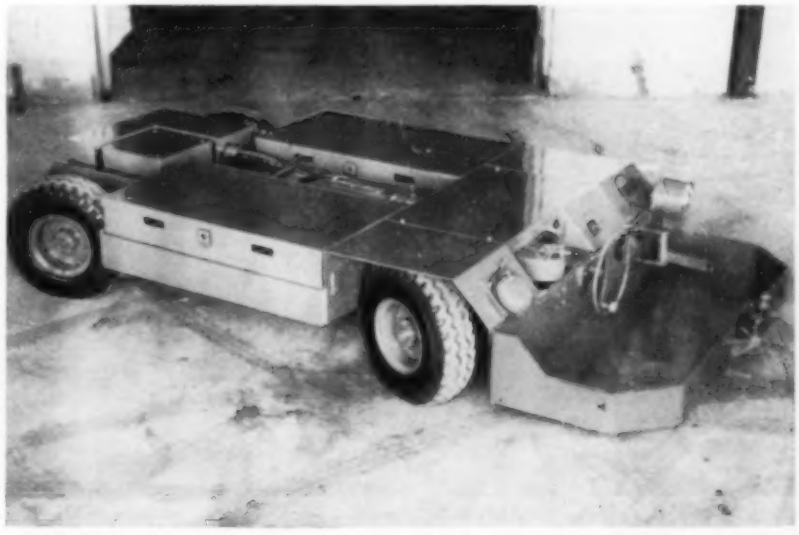
The tractor, only 24 in high, is a 4-wheel-drive 4-wheel-steer unit. Complete with Exide 96-v 12-kwhr automotive-type battery, arranged in two demountable steel trays, it weighs 4,000 lb. Length of the tractor, including both decks, is 12 ft 6 in; width, 64 in; ground clearance, 6 in; turning radius, 16 ft. The tractor is driven by a single traction-type motor and the full load speed is 4.2 mph. The extra battery permits charging while the unit remains in service.

Charging is done with a Kersey selenium rectifier with voltage-relay-timer charge control for automatic kick-off.

The 4-wheeled rubber-tired cars, designed to suit coal company requirements, have 7x14-ft flat beds. Ends are open but the beds have sides 12 in high. Tires are 5.50x8 and car height over the sides is 18 in. The bottom plate is sloped upward at the ends like a sled runner to minimize any tendency to dig into the bottom. Wheel gauge is 7 ft 6 in; wheel base, 4 ft.

When the entry has penetrated to 3,300 ft, it is planned to take top in one heading and install track for handling men and supplies. The battery tractor and special cars will then work inby the end of the track.

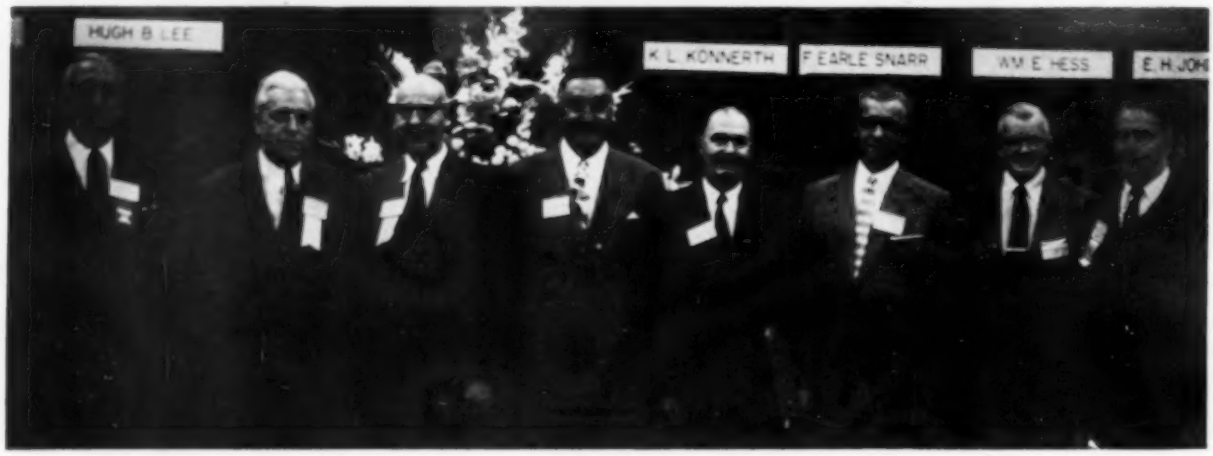
The mine is operated with one Joy 20-BU loader and two Joy 8-SC 2-ton shuttle cars discharging directly to the belt. The mine crew consists of 11 men including the foreman. Production is normally 125 tons per shift and the seam is being worked two shifts per day.



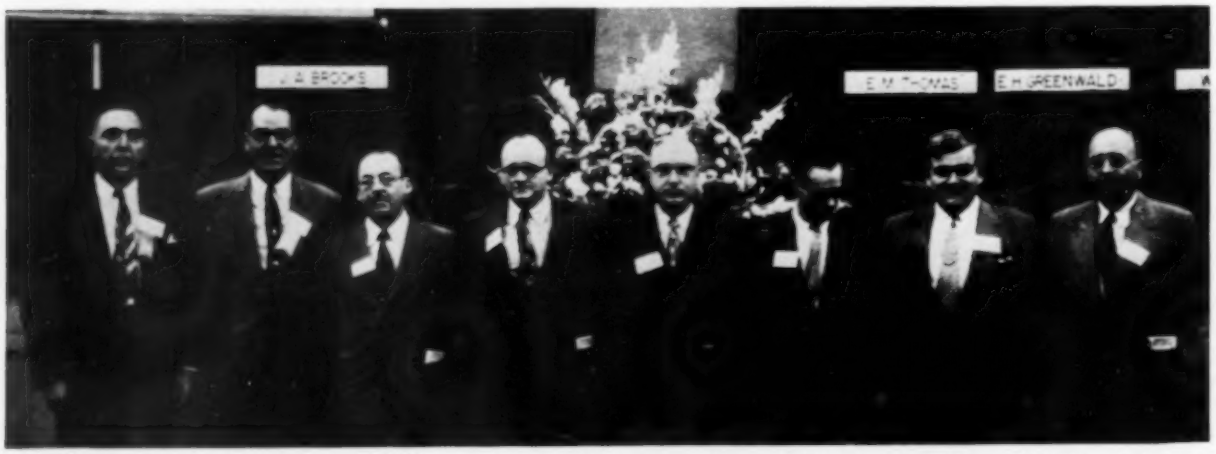
WITHOUT FRONT DECK, as installed on Keen Mountain unit, tractor is only 10 ft 6 in long. Power is provided by 96-v 12-kwhr automotive-type battery.

AMC Coal Convention—A Coal Age Staff-Written Report.

CONTINUOUS MINING—Emmett T. Lang (left), North American Coal Co., floor committeeman; D. L. McElroy, Pittsburgh Consolidation Coal Co., chairman; Richard T. Todhunter Jr., Barnes & Tucker Co.; H. A. Quenon, Eastern Gas & Fuel Associates; M. A. Williams, Oglebay, Norton & Co.; W. C. Campbell, Old Ben Coal Corp.; John A. Stachura, Enoco Collieries, Inc.; B. E. Rector, Westinghouse Electric Corp.



CONTINUOUS MINING—E. R. Price (left), floor committeeman; L. C. Campbell, Eastern Gas & Fuel Associates, and chairman, AMC Coal Div.; Hugh B. Lee, Maumee Collieries Co., national program chairman; K. L. Konnerth, consultant; F. Earle Snarr, Freeman Coal Mining Corp.; W. E. Hess, Jones & Laughlin Steel Corp.; E. H. Johnson, Kennametal, Inc.; and Glenn B. Southward, AMC.



ROOF SUPPORT—J. A. Brookes (left), Mather Collieries, floor committeeman; C. B. Baton, Joanne Coal Co., chairman; E. M. Thomas, USBM; E. H. Greenwald, Boone County Coal Corp.; W. J. Lewis, Ohio Brass Co.; W. F. Diamond, Island Creek Coal Co.; Woods G. Talman, U. S. Steel Corp.; C. T. Holland, Virginia Polytechnic Institute.

STRIP MINING—E. B. Agee (left), floor committeeman; W. E. Mullins, Midland Electric Coal Corp., chairman; J. Robert Bazley, J. Robert Bazley, Inc.; Forbes R. Clark, United Electric Coal Cos.; J. Littlepage, Cardox Corp.; J. M. Poindexter, Salem Tool Co.; Quentin G. Bullock, Compton, Inc.; and James A. Miner, Colonial Coal Mining Co.

AMC Report on Mining Progress

Fifty-five mining men total up advances in methods and equipment and forecast future developments in deep mining, strip mining, coal preparation, maintenance and safety at the 1955 Coal Show of the American Mining Congress, Cleveland, May 16-19.

Continuous Mining

"A successful mining operation today is one which can, at a cost competitive with other fuels, supply a product of satisfactory physical and chemical quality at the proper time, in the proper quantity, and at the proper location to suit the customer's requirements."

A mine operator, said K. L. Konnerth, mining consultant, may have reduced his mainline transportation to the lowest cost, arrived at the most economical preparation commensurate with customer requirements, and concluded he can't do anything about freight rates. But he has left to work on the operating area from the coal face to the main-line transportation. The goal is maximum usage of continuous-mining facilities.

First comes proper planning to take full advantage of the equipment selected for the percentage of recovery desired. A current practice cited was the 90-deg block system when complete recovery is desired, and the 60- and 75-deg block system when only partial recovery is desired. Among the physical conditions governing selection of areas and effectiveness of continuous mining are type of bottom, structure and hardness of the coal seam, variations in seam thickness, faults, roof conditions, and liberation of gas at the face. Future studies of design for continuous mining should seek the elimination of as many of those obstacles as possible.

Increased horsepower and commensurate facilities for supplying electricity to the face will be met and solved, including the question of using AC power for new mines. Proper maintenance, advisability of setting up spare sections, scheduling overhauls, and getting manufacturers to build machines of adequate strength are problems of the present and future.

Greatest practical concentration, widely recognized for its various cost and operating advantages, is approached with the ultimate continuous usage of equipment. It should be recognized that continuous mining is still in its infancy and there is much to be done before it can take its rightful place. In time the industry will achieve a reasonably universally applicable machine of sufficient strength and power to permit maximum continuity of face operation. Concluding with a few remarks on proper operation of the equipment, Mr. Konnerth said there can be no substitute for topnotch supervisory personnel.

Continuous System

"Next month will round out 4 yr of full-retreat mining in the Illinois No. 6 seam using only continuous miners at Orient Mine No. 3."

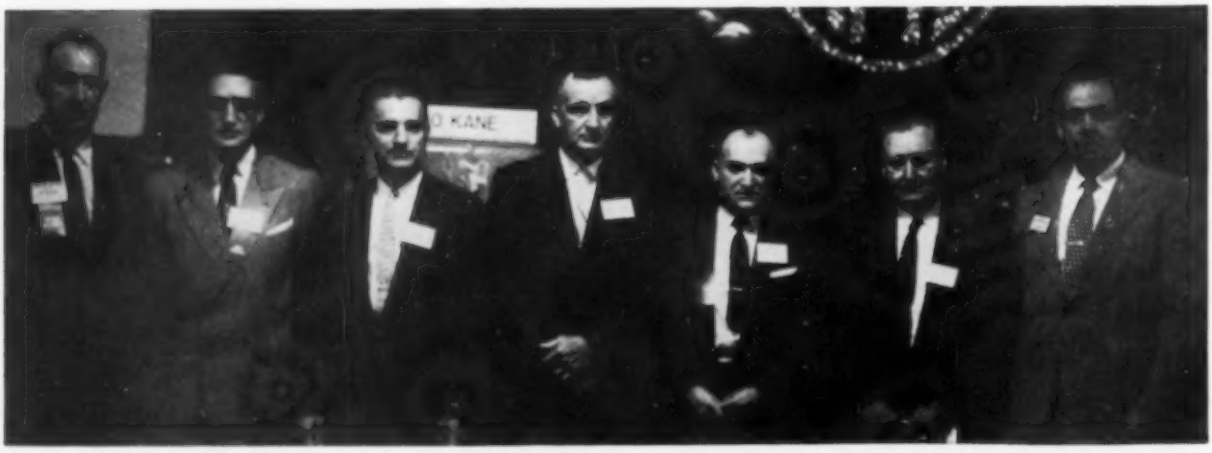
Crediting the continuous miner to some degree with disspelling the long-standing idea that pillars in southern Illinois could not be extracted by the retreat fracture line, F. Earle Snarr, vice president, Freeman Coal Mining Corp., described the complete continuous system at Orient No. 3. Each panel entry has two Marietta and one Joy JCM miners retreating along the fracture line. Two Joy shuttle cars haul from a miner and discharge to a 36-in 425-fpm panel belt, this in turn discharging to a 48-in 550-fpm main-line belt. The first Marietta miner was installed in August, 1950, and to date eleven have been placed in operation in Orient No. 3.

Experience with two McKinley boring-type entry drivers at Orient No. 2 mine from 1927 set the stage for planning No. 3 as a continuous-miner operation at its outset in 1947. The entry driver was successfully redesigned and built during a 2-yr program promoted by the coal company. The resulting Marietta miner retained the desirable features of the McKinley and added features for the job to be done.

Bit cost using carbide-tipped bits for 1,600,000 tons of coal produced in 1954 was 3.3¢ per ton, including resharpening. Each room is pillared shortly after it is developed. Therefore, roof problems are of short duration. Initial falls occur after about 60 of the 60 x 60-ft blocks, or six rooms, have been mined. Almost 5 million tons of coal have been extracted without a serious roof-fall accident.

COAL PREPARATION—W. J. Skewes (left), Pocahontas Fuel Co., chairman; J. D. Ireland, Peters Creek Coal Co., floor committeeman; Emery Milligan, Freeman Coal Mining Corp.; J. D. Snyder and J. E. Tobey Jr., Blue Diamond Coal Co; F. P. Calhoun, Rochester & Pittsburgh Coal Co; D. G. Werner, Mathies Coal Co.; and H. R. Middleton, Wilmot Engineering Co.

STRIP MINING—Gene Long, Truax-Traer Coal Co. (left); E. C. Weichel, The Hudson Coal Co., chairman; W. W. Dukes, Stonefort Corp.; H. A. Raivio, Caterpillar Tractor Co.; A. S. McClimon, Euclid; Ralph H. Kress, Dark Truck Co.; and Hoyt W. Smith, LeTourneau-Westinghouse Co.



HAULAGE AND POWER—C. O. Kane, Armco Steel Corp. (left), chairman; J. A. Younkins, floor committeeman; Stephen Krickovic, Eastern Gas & Fuel Associates; W. L. Husk, West Kentucky Coal Co.; Myron Kok, Warner Collieries Co.; John B. Harvey, Perry Coal Co.; and W. R. Morton, General Electric Co.

Screen analyses of coals produced by the Marietta miner and Joy continuous miner in pillar work in Orient No. 3 show the following percentage advantages for the Marietta miner: above 6 in, 4.4; above 3 in, 15.3; above 2 in, 16.4; above 1½ in, 15.1; above ¾ in, 9.4; and above 7/16 in, 5.1. Below 6-mesh the percentages were essentially the same.

Underground electrical distribution is at 4,160 v with equipment insulated to permit changing to 7,200 v if desirable in the future. Sealed-tube 500-kw ignitron rectifiers located at the mouth of each ½-mi-long panel territory supply 275 v DC. Approximately 9,000 ft of 1,000,000 cir mil feeder cable is required for a fully developed panel territory. The 1,000,000-cir mil conductors are doubled on both positive and negative for the first 2,000 ft, and are single the last 2,500 ft.

The seam ranges from 7 to 11 ft thick. The Marietta miner is equipped with 7-ft arms and, where possible, 1 ft of bottom coal and 1 ft of top coal are left.

The bottom, left to protect the buggy roads during development, is mined with the Marietta miner during pillar-recovery operations. The methods and machines adopted are meeting the natural conditions with better success than previously achieved by conventional methods and equipment.

Answering a question, Mr. Snarr said that the tonnage per man-shift with continuous mining averages as good or better as with conventional equipment. Moreover they are overcoming top conditions they could not cope with with conventional equipment.

Continuous Maintenance

"Maintenance of continuous-mining equipment is one of the biggest problems confronting the operator of this type of equipment today."

Total cost of continuous mining machine maintenance is almost directly proportional to the bit cost, said W. E. Hess, manager of coal mines, Vesta-Shannopin Coal Div., Jones & Laughlin Steel Corp. Confining his presentation to the machine itself, he noted that while there is considerable variance in total maintenance costs, labor and supplies, a composite of these costs for five mines operated by several companies is 50¢ per ton compared to 33.1¢ per ton for conventional mining equipment at four of these mines.

Principal factors affecting machine delays are: (1) faulty design and poor materials and workmanship in manufacture, and a reluctance to make changes, (2) availability of replacement parts from strategic locations in the various fields, (3) physical conditions in the seam, (4) development or retreat operation (less maintenanuce should be required on machines working on retreat), (5) whether the machine be operated three shifts or be allowed one shift for maintenance, (6) amount of supervision per section and ability of the foreman, (7) selection of operating personnel, (8) type and number of maintenance personnel and (9) power supply. "Proper power supply for continuous miners is a must."

Mr. Hess emphasized the necessity of proper training for the maintenance crews. The men who were satisfactory and competent for hand loading or conventional equipment must be retrained for maintaining continuous miners. For small operations the training can be secured by visiting the manufacturer's plant or learning at the mine from the manufacturer's demonstrators, who are both operators and mechanics. At the larger operations this must be supplemented by a definite training program.

Various courses offered by schools do not provide the practical training that can be provided by the individual mining company. For some years the Vesta-Shannopin Coal Div. has maintained a classroom equipped for practical training in welding and the repairing of panel boards for machine and shuttle cars, motors, hydraulic pumps, hydraulic motors, hydraulic controls, etc.

Number of breakdowns and duration of each can be influenced by the following factors: (1) availability of maintenance personnel, (2) availability of supplies for repairs, (3) spare unit assembly (4) maintenance time available, (5) proper lubrication and (6) systematic inspection. Mining companies should modernize older machines to make them standard with the improved machines purchased later. From close observance of repeated breakdowns the amount of tonnage between overhauls can be determined. For the large operation with a good central shop available, local rebuilding can be most advantageous. For the smaller operations, there are a number of commercial shops that do excellent jobs in rebuilding and modernizing machines.

Severe shock loads from sulphur balls and partings, said Edwin H. Johnson, manager, Mining Tool Div., Kennametal, Inc., in turn causing high bit costs, are a warning of high maintenance costs ahead for continuous mining machines. He said that too often opinions and knowledge of the field service engineer for a machine manufacturer are not given due weight at the office and that the coal operator does not use the man to the best advantage. Referring to proper training for operators, he said that the interest on the investment in the machine may equal the wages of the operator.

Continuous Mining

"The big reason for the development of continuous mining machines was the foreseeable need of volume production of low-cost coal."

"With reasonably efficient continuous mining machines now working, the development of a successful haulage system is now under way in co-operation with equipment manufacturers," Richard Todhunter Jr., general manager, Barnes & Tucker Co., said in opening his discussion of continuous mining in the 42-in Lower Kittaning seam. Continuing, he observed that the achievement of continuous haulage will undoubtedly bring on further developments of equipment and systems to satisfy the demands of the coal industry.

At the Barnes & Tucker's Lancashire No. 15 mine, the Kittaning seam is 38 to 42 in thick and is overlain by 5 to 10 in of bony. The bottom is 6 to 8 in of fireclay underlain in turn by 6 to 10 in of coal, 8 to 14 in of fireclay and 1 to 3 in of coal, Mr. Todhunter said.

The immediate roof is normally a strong black shale that grades into sandy shale and fine-grained laminated sandstone. Some local areas have a cross-bedded sandstone roof that breaks up immediately after exposure to air.

Workings dip an average of 3%, with local grades as steep as 17%. Other irregularities include occasional bottom rolls and small areas of bad roof, Mr. Todhunter said.

Continuous mining was started in January, 1949, when a Joy continuous miner was installed. Two more were added later. In December, 1952, a Jeffrey Colmol was put in service and since then, three more have been added. About 75% of mine output currently comes from continuous miners, Mr. Todhunter commented.

In the past year an effort has been made to attain continuous haulage with the Jeffrey Molveyor and the Joy extensible belt. Results thus far have been encouraging, Mr. Todhunter said, but much change and development are necessary before a standard acceptable unit will be working in the physical conditions in the Lower Kittanning seam.

Three entries are developed on 60-ft centers with cross cuts on 90-ft centers. Rooms on 60-ft centers are driven 35 ft wide with a Joy loader; developed 16 ft wide on 45-ft centers with the Joy continuous miner; and mined 19 ft wide on 45-ft centers with the Jeffrey Colmol. Pillars are extracted with all three types of equipment, Mr. Todhunter explained.

The two types of continuous miners work similarly as far as extraction goes, the main difference being in haulage equipment and crews. Mr. Todhunter listed the following equipment and crews:

Joy continuous miner—1 continuous miner, with operator and helper; 1 Lee-Norse KBC shuttle car, operator; 1 Lee-Norse 43KB converted surge shuttle car, operator; 1 30-in mother belt, boom attendant; 1 car-spotting hoist; also ½ mechanic and 1 face boss.

Jeffrey Colmol—1 Jeffrey Colmol, with operator, helper and timberman; 2 Lee-Norse shuttle cars, 2 operators; 1 30-in mother belt, boom attendant; 1 car spotter; also ½ mechanic and 1 face boss.

Pillars are extracted with continuous mining machines by starting lifts from the back end, usually leaving a small peg at the corner. Lifts are taken successively until the pillar is extracted and breaker posts are then set across the road before starting the next pillar, Mr. Todhunter said.

The Molveyor was found to carry re-

MECHANICAL MINING—Birch Brooks, Viking Coal Corp., chairman; H. O. Zimmerman, Inland Steel Co., floor committeeman; R. J. Bowen, U. S. Steel Corp.; A. H. Mandt, Stephens Elkhorn Fuel Corp.; A. E. Long, general manager, Bradford Coal Co.; G. A. Schnee, Philadelphia & Reading Coal & Iron Co.; Ralph W. Hatch, Hanna Coal Co.

FOREMANSHIP, MAINTENANCE, COST CONTROL—David Ingle, Jr. (left), Ingle Coal Corp., floor committeeman; James Hyslop, Hanna Coal Co., chairman; E. B. Leisenring Jr., Stonega Coke & Coal Co.; H. E. Hastings, H. H. Fraser & Associates, Ltd.; Gordon MacVean, National Mine Service Co.

markable tonnages where the conditions permitted. However, it was found not suitable for steep pitches. The extensible belt has been carrying the coal nicely, Mr. Todhunter explained, although the bridge connection is not perfected, especially for pillar work.

Pillar Recovery

"Early experience at the Keystone Mine with the second of two semi-rigid-type continuous mining machines designed for operation in low coal, reflects a brighter production future."

In continuous mining it is very advantageous to decrease the number of open places adjacent to a robbing line to a minimum, thereby eliminating much deconstruction work and greatly improving physical conditions, said H. A. Quenon, division manager, Eastern Gas & Fuel Associates. It is essential that speed of extraction be on a par with roof and mine floor convergence, otherwise caving and heaving will create impossible mining conditions.

With an average crew of eight men, production has averaged 210 tons of clean coal per shift, or 26.7 tons per face man. On a raw-coal basis this is 273 tons or 34 tons per man shift. The Lee-Norse miner discharges into two Joy shuttle cars which carry coal to a 30-in belt conveyor emptying into 145-cu ft mine cars, Mr. Quenon said.

The machine has been working in rooms and pillars in a butt entry developed by conventional equipment. Rooms, in line with entry breaks, were driven 17 ft wide with breakthroughs on 70-ft centers, leaving 53x78-ft blocks to be recovered by the open-end method. In a plan designed for continuous mining rooms are projected 17 ft wide on 63-ft centers, making room pillars 46x53-ft. Splits, 18 ft wide, are driven as required to set up a final pillar, 14x53-ft, to be removed in 9-ft-wide lifts. Penetration to the depth of the machine was considered desirable but because of gaseous conditions it was necessary to limit penetration to a depth of 6 ft. The goal with the projection plan is to maintain a flat robbing line by successive removal of pillars with only a minimum of room development, Mr. Quenon added.

The major obstacle to increased production is the time consumed installing adequate roof support. Drawslate must be well supported to within a short distance of the face and the operator is not permitted to go beyond the protection of crossbars. The maximum safe advance under crossbars supported on jacks or timbers before permanently bolting them in place is about 32 ft, Mr. Quenon emphasized.

The Extensible Belt

"We consider that the extensible belt conveyor, as used in this mine, has made it possible to more closely approach true continuous mining."

We are able to produce more coal per shift with the extensible conveyor than with shuttle cars, as well as save one man per shift, and also are able to extend the length of rooms to approximately double the former length, said M. A. Williams, general superintendent, Oglebay, Norton & Co.

The method of mining with the continuous miner and extensible belt at the David Z. Norton No. 3 mine is about the same as with shuttle car haulage, except that rooms are driven 600 ft deep instead of 300. Room and entry pillars are not recovered, Mr. Williams said.

Room entries are driven with three headings on 50-ft centers to a depth of 2,000 ft. Rooms on 32-ft centers are driven 17 ft wide to a depth of 600 ft and are mined advancing on the return-air side and retreating on the intake side.

They are mined in groups of five and the sixth room is left for roof support. One continuous miner and two shuttle cars are used to develop the entry. The extensible belt follows entry development by mining rooms on one side on advance, Mr. Williams declared.

A four-man crew, consisting of an operator, two timbermen and a supplyman operate the extensible unit. The crew adds 100 ft of belt in 2½ to 5 min, permitting a 50-ft advance, and moves the conveyor from one room to another in about 2 hr, Mr. Williams said.

Surge-Car Benefits

"It is entirely possible that a surge car of proper design could for all practical purposes eliminate down time caused by inadequate haulage facilities."

Four cases of continuous mining utilizing a portable surge car were discussed by William C. Campbell, assistant to the vice president, Old Ben Coal Corp. A surge car has been used with a Goodman 500 continuous miner in the following: (1) panel development in good cutting; (2) panel development in moderately hard cutting; (3) rooms and pillars; and (4) main entry development.

A Joy 5SC shuttle car with a 2-ft extension on the discharge conveyor is provided with a pushbutton control that permits the miner helper to move the conveyor from a position directly behind the continuous-miner operator. The extra length of conveyor facilitates loading the haulage cars and eliminates some spillage.

In entry development in good cutting, studies indicated that a surge car is a disadvantage. In entry development in hard cutting, use of the surge car provides an additional 47 tons per shift. In pillar work, shuttle-car change time is too short to realize any benefit from the surge unit, Mr. Campbell declared.

In permanently main-entry development, the surge car provided advantages. Although rate of advance and tons per minute loaded often exceeded surge-car capacity and delays were experienced, they were minor when compared to those that would have occurred had the surge car not been used, Mr. Campbell said.

In an average shift when 500 tons of coal was produced, shuttle-car haulage distance averaged 350 ft. When using the surge car the delay waiting for the haulage unit to return averaged 0.3 min. Had no surge car been used, the delay would have been 2.0 min per car. Thus, the surge car made it possible to load 500 tons of coal, whereas mining with only two shuttle cars would have produced only about 300 tons.

AC Face Power

"Our experience with AC equipment to date at Enoco mine has been very satisfactory."

"The use of AC equipment underground is not new in Indiana," said John A. Stachura, general superintendent, Enoco Collieries, Inc. A thorough study was made to compare AC and DC power on the following points: initial cost, cable cost and ease of handling cables, efficiency, and safety.

The initial cost of AC equipment was considerably lower than DC equipment. Electrical equipment on an AC Colmol was 9.8% less than on a DC machine. The 300-kva transformer was 69% less than a 300-kw rectifier. Application of 440 v AC reduced the cable cost more than 50% and because of the smaller size simplified underground handling, Mr. Stachura declared.

The problem of maintaining good face voltage also was simplified with AC power since portable transformers could be quickly and easily moved. The problem of training maintenance men is greatly simplified because of the simplicity of construction. Greater protection from electrical hazards also follows with AC equipment, Mr. Stachura pointed out.

Introduction of the Westinghouse 300-kva dry-type nitrogen-filled transformer was another step forward in simplifying the problems of maintaining good face voltage. These are the first 300-kva dry-type installed for underground use. Units are skid-mounted and have plug and receptacle type entrances for quick connecting and disconnecting of primary and secondary feeders.

After 18 mo of service, the 440-v AC electrical setup has been found to be the outstanding feature of the Colmol continuous mining setup. Because of the portability of the substations and the ease with which sections of cable can be added or removed, there always has been good face voltage. Sectionalized cable and the intrinsically safe control make it possible for anyone to add or remove cable with safety and efficiency.

Electrical repairs on the Colmol to date include one 600-amp circuit breaker destroyed as a result of a faulty connection on the trailing cable; also, a set of contactor tips were changed after 1 yr of operation but should have an additional year of life left. The only motor trouble was caused by a defective fan causing a ground fault. Protective devices have been very helpful.

In discussing Mr. Stachura's paper, B. E. Rector, manager, mining section, Westinghouse Electric Corp., said that the advantages of AC power over DC makes the system attractive. In general, the power-distribution problems are decreased with the increased voltages. The unitized power center has made it possible to provide good face voltages. Better voltage is required for AC motors and controls than for DC, Mr. Rector noted.

A trend toward more mechanization and more power demands seems to indicate a trend toward more AC systems. Each individual case must be given a thorough analysis before any installation of AC equipment is made. If this is done, the AC installation will probably offer some advantages, Mr. Rector declared.

Thick-Seam Mining

"A balanced system of room-and-pillar mining is now practiced."

Mechanical mining in thick lightly pitching coal at Geneva mine was detailed by R. J. Bowen, mining engineer, Columbia-Geneva Steel Div., U. S. Steel Corp. U. S. Steel took over Geneva from the government in 1946. Methods and equipment are the same as in the Columbia mine which Columbia Steel Co., a subsidiary of U. S. Steel, purchased in 1930 and mechanized with track equipment in 1938. All production comes from the Lower Sunnyside seam averaging 14 ft thick and ranging from 8 to 16 ft. The seam pitches 11 to 20% under rough mountainous terrain, and depth of cover over present workings is 200 to 2,500 ft. Numerous faults are encountered.

The mine was opened by strike entries from the outcrop in Horse Canyon. In the raise districts of the mine, development is up the pitch from the strike entries with belt-conveyor haulage to the main motor road. The dip districts use locomotive district haulage from rope terminals or partings off the slope.

Conventional trackless mobile equipment is used in both districts and an operating unit includes a rubber-tired cutter with mounted hydraulic coal drill, a large crawler-mounted loader, two 7-ton shuttle cars, elevating conveyors, portable high pressure rock dusters, stub-end feeders, etc. Special braking features are required. Shuttle cars have dynamic and mechanical brakes, and loaders and cutters have convenient quick-acting mechanical emergency brakes for stopping on grades up to 20%. Some of the cutting machines are capable of cutting level 13 ft above the floor line. Recently purchased cutters are equipped with bug-dusters and self-spotting coal drills that can drill 9-ft holes.

In the balanced room-and-pillar system, solid blocks of coal are kept near the working area and the cave line is maintained 45 deg to the strike. All entries, rooms and crosscuts are on 80-ft centers or multiples. Rooms 18 ft wide slough to 20 ft. Pillars are split to make blocks 60 x 60 ft before splitting again for final extraction, leaving two curtain pillars 60 x 20 ft. These are then reduced to triangular shaped stumps which crush or are drilled and shot to induce caving.

Thin-Seam Mining

"The most important phase of our Piggyback mining system is a well-balanced cycle, with close supervision."

Discussing mechanized mining in the 34-in Elkhorn seam with Piggyback conveyors (*Coal Age*, September, 1954, p 106), A. H. Mandt, vice president, Stephens Elkhorn Fuel Corp., cited the January, February and March, 1955, tonnages per man-shift of 22.03, 22.35 and 23.45, and said that they include

moves and supervision. For that 3-mo period the production averages per 2-shift day, operating 5 days per week, were. for January, 1,190 tons per day and 10.085 tons per payroll man; February, 1,111 and 9.415 tons; and March, 1,246 and 10.56.

Section equipment consists of one Joy 12-BU loading machine, two Long Piggybacks, two room and one mother conveyors (all chain type), one Brownie car spotting hoist, one Jeffrey elevator, one crawler-mounted supply truck, one three-wheeled push cart, two Femco trolleyphones, two C-P 572 high-speed coal drills, two Goodman cutting machines (one in each place), and 10 or 12 jacks.

Gratifying results have been attained with a maintenance system started 2 yr ago under which a 5-man repair crew works on a third shift, with a shop man on each mining shift for general repair in the outside shop and for emergency trips to the working places.

Practice at a mine of the Clearfield Bituminous Coal Corp., Miller B seam, 39 to 40 in of clean coal, many rolls and clay veins, was detailed by James D. Sutton, superintendent. Top cutting under high bone is done with Goodman 712 top machines and bottom cutting under low bone with Goodman 412 low-vein machines. Joy 12 BU machines load into Goodman shaker conveyors. Four units deliver to a Jeffrey 30-in mother belt terminating at a mine-car loading station. The section crew of 15 men includes four 3-man face crews.

Chain conveyors are used instead of shakers on development because the work is to the dip with grades beyond those practical for shakers. A Goodman scraper loader is used to brush the heading. A spare cutting machine is in each section. By placing a loading machine in each place face cost was cut about 20¢ per ton which exceeded the depreciation on the extra machines. Repairs and as many moves as possible are made on the third shift. Bridge conveyors are not used because of the large amount of roll materials that have to be gobbed.

Longhole Mining

"The trend, at the present time, is toward the exclusive use of long holes for mining."

The success of longhole drilling in pitching anthracite seams, observed Garfield A. Schnee, general superintendent, Philadelphia & Reading Coal & Iron Co., calls for: (1) a positive ventilating system which can be controlled at all times, (2) a definite plan of procedure which can be followed at all times, (3) governing all drill-hole spacing and patterns by the nature of the coal and local conditions, (4) thoroughly cleaning all drill holes before tamping, (5) limiting the number of sticks of powder to be pushed into the hole at one time in tamping to avoid spreading the lower stick, (6) use of a plastic-type dynamite if possible, (7) driving all openings to be used for drilling large enough to provide plenty of room for operating the drill and changing connections, and (8) maintaining good firm connections on the auger sections to keep the hole in alignment.

Methods of mining with longhole drilling in pitching coal discussed by Mr. Schnee were the diamond-shaped system used for 5 yr at Knickerbocker colliery, the slant-chute method at Newkirk colliery and other methods used at Potts and Locust Gap collieries. Holes up to a maximum of 45 ft have been drilled in the slant chute, diamond-shaped and below-rock-hole recovery methods. In Potts colliery, where longhole drilling has been practiced since 1949, bottom holes range in length from 40 to 115 ft; middle holes from 15 to 50 ft; top holes, as indicated by vein thickness.

The drill is a Jeffrey A6 with Ingersoll-Rand air motor, bits are 2½-in tungsten-carbide, and rods are 2- and 3-ft sections of 2 1/16-in Diamond E with thread and continuous spiral. Drilling labor cost has been approximately 32¢ per foot, and maintenance and depreciation approximately 4.8¢ per foot. Approximately 0.22 lb of explosive is used per ton of prepared coal at a cost of 20.6¢ per foot of hole.

Maintenance Costing

"As competition in the fuel business becomes keener, operating executives will require more cost records than ever before. High-cost-maintenance items must be pin-pointed and corrective measures taken."

Use of IBM machines to supply the operating, maintenance and purchasing departments of the Hanna Coal Div. with detailed information needed to properly manage the properties was described by Ralph W. Hatch, statistician, Hanna Coal Co., with emphasis on the maintenance end. The machines, installed in 1949, have cut clerical costs, furnished detailed information on all phases of operation at a lower cost, and leveled out peak loads.

Supply accounting has been on the IBM machines since 1952, and since that time inventories and supplies have been reduced more than 50%. Classes of machines, each machine, and the various parts of each type have each been given a code number. Every hour of labor by mechanics on a piece of equipment is recorded daily, as well as supplies issued and charged to the piece of equipment. By sorting cards, which the machine can do at 650 per minute, labor and supplies for any class, machine or component part can be computed as a sum and per ton.

Roof Bolting

"The closest approach to effectiveness [in roof control] that we have—or are likely to have—is minimum-center systematic support."

Responsible mining companies formerly got minimum-center systematic support with timbering and are now getting it with roof bolts, Edward Thomas, USBM mining engineer for roof control, noted in reviewing latest developments in mine-roof bolting. This type of support is obtained without benefit of the appearance of the roof, roof testing or the judgment of individuals. It is done according to a predetermined plan based on long-term experience over an entire mine or group of mines.

Under this plan it is estimated that for every 100 supports installed only 10 actually support any roof during their life. Yet it is known that in decreasing the number of supports in the pattern, the chances of accidents are increased. Nobody disputes that a good well-placed timber will provide as much support as a bolt. The main advantage of bolting is that the pattern can be made more efficient since bolts are placed in the same space occupied by equipment.

Mr. Thomas cited the work of Dr. L. A. Panek, of the bureau's College Park research staff, as possibly indicating a future direction for improved bolting techniques. Dr. Panek has recently completed a series of model testing experiments designed to stimulate actual underground roof strata conditions capable of bolt reinforcement. The experiments offer no quantitative data on the external load a bolt-compacted roof beam is capable of carrying or what load it is expected to carry. But they do provide a starting point for determining ways in which the compacted beam can be improved through changing the pattern, additional bolt length, and other factors. Most of the conclusions from this work, it was emphasized, have not been tested in the field and therefore should not be used to justify underground experimentation without safeguards.

Bolting Weak Top

"An effective roof support system frequently has to be evolved through experience."

E. H. Greenwald, general manager, Boone County Coal Corp., related his company's experience in developing a roof-bolting system suitable to the particular roof strata conditions encountered in the Chilton seam.

The roof rock in the Chilton seam has these components, in their order above the coal seam: drawslate and fireclay, 4 to 16 in; average, 9 in; rider coal, 1 to 3 in; weak shale, 1 to 20 ft; and massive sandstone, the main roof. At times, the lower portion of sandstone has a fine laminated structure and is therefore not very strong.

To meet these conditions, bolting was begun in 1949 with percussion drills. Later, however, a change to rotary was found necessary. "We made our own rotary unit with a Jeffrey drill on a post." In 1951 this was followed by the use of the first rotary hydraulic rig, a Joy RBD10.

Development of an area not previously

mined was begun in 1954. Here, the coal thickness was 72 to 84 in, draw rock was thin, and there was little shale below the main roof. Again the main roof was laminated, creating a tendency toward weakness. With a severe grade and such roof conditions, the hydraulic drill proved inadequate. Timbering was required: 3 x 6-in by 16-ft bars held by three bolts and a row of line timbers.

Later, the Joy RBD11 roof-bolting unit was developed and units were installed at the mine. This twin unit has two independently controlled drill booms and hydraulic hand-held saws which permit each crew member to work independently. Drilling is done at 600 rpm and bolt tightening to 240 ft-lb torque is at 300 rpm. The unit is capable of a 5,000-lb thrust, but Greenwald cautioned that bits and drill steel at this level of operation do not hold up well.

Pillar Extraction

"Integration of a roof-support system with new equipment and appropriate mining methods can make it possible to meet tonnage and cost objectives."

Practicing partial extraction under an extremely difficult roof at Elkhorn No. 3 mine, in eastern Kentucky, the following equipment, roof support and mining system has evolved as the most effective in achieving lower costs, less manual work and higher tons per man, said W. F. Diamond, chief engineer, Island Creek Coal Co.

The equipment setup for a single section consists of two chain room conveyors, a chain cross conveyor, two Piggybacks, a Long 88 Pigloader, and a high-capacity loading machine especially designed for work with Piggybacks in close posting.

Roof support was achieved through installing six bolts per cut, five being set in a line astraddle the roadway and the sixth in the center of the roadway approximately 4 ft from the row of five. In addition to these, a total of 25 steel timber jacks with wood cap blocks were used in the face area and 18 posts were set per cut just outby the active face area. Posts were set in two rows approximately 4 ft apart. The same timber standard used in room work was also used in entries except that five bolts and fourteen posts per cut were set.

The mining system followed is a room-and-pillar operation with no recovery of the room or butt-entry pillars. The mains and flat entries consist of eight headings each driven 28 ft wide on 60-ft centers, with four-heading butt or panel entries turned right and left off the mains or flat entries at 880-ft intervals. The butt-entry headings are driven 28 ft wide on 55-ft centers to a depth of 2,400 ft, with rooms turned in pairs right and left on retreat and driven 40 ft wide on 60-ft centers. This system results in panel entry recoveries of 70 to 72% of the coal in place—the maximum possible recovery with a partial extraction mining system if squeezing is to be avoided.

Based on experience at Bartley No. 1 mine, southern West Virginia, where full extraction under a good roof is practiced, Mr. Diamond cited certain principles that must be followed to produce consistently good tonnage at a reasonable cost:

1. Keep the pillar line straight.
2. Remove all the coal. Leave no stumps to cause a shift in the weight.
3. Use cribs to provide a yielding support and thus prevent a sudden collapse of the roof. Insofar as possible, avoid the use of posts on the pillar line.
4. Keep development work well in advance of the pillaring operation.
5. Use open-end lifts in extracting the pillars and do not work more than one lift off a pillar at any one time.
6. Keep blocks uniform in size and large enough to support the weight while advance mining is being carried on.
7. Reduce oversize pillars, which are advantageous on development, to the size of the regular blocks well in advance of the pillaring operation.
8. Provide a very high order of supervision on pillar line work.

Controlling Bumps

"Loaded blocks can be augured, bumps can be set off, questionable areas can be probed, and blocks can be preweakened and safely mined in the Pocahontas 4 seam."

A system of auger drilling to control mountain bumps in the Pocahontas No. 4 seam was reported on by Woods G. Talman, general superintendent, Coal Div., U. S. Steel Corp., Gary, W. Va. The system, a joint function of operations, engineering and safety in the Gary-Lynch district, has evolved into the three following major activities (for full report, see *Coal Age*, January, 1955, p 68):

1. Setting off bumps by triggering them with 6-in augers—mainly point areas known to be loaded.
2. Probing doubtful blocks with 6-in augers to prove whether they are loading. Negative proof permits continued orderly mining.
3. Gradually unloading large blocks known to be loaded by using 24-in augers, followed by normal development of the blocks.

Track Haulage

"The designing of a suitable and economic main-line haulage system for a mine must include a thorough engineering analysis of all factors involved."

Each mine with its various physical conditions and operating problems, will require special treatment for the most part," observed Stephen Krickovic, chief engineer, Eastern Gas & Fuel Associates. There is no standard formula applicable to all mines, and that is especially true today with the increasing emphasis that is being focused on heavier and faster trips. To undertake the job in any other manner would be inviting the possibility for inefficient operation and loss of money."

Principal considerations include: (1) projection of mine and life to determine location and extent of main line, (2) type and number of cars with emphasis on operating and maintenance cost, (3) main-line locomotive type, size, number and general specifications, (4) the advisability of using intermediate haulage, (5) specifications for a high-speed haulway, including dimensions of heading and its timbering, roadbed and grades, track, trolley, controls (such as, dispatching, phones, signals, automatic switches, etc.), power and section circuit breakers, and whether to use single or double track.

Using theoretical examples of mines and conditions, Mr. Krickovic worked out the most efficient equipments. These calculations showed large savings for larger cars and larger mine locomotives.

Shuttle-Car Haulage

"In the future, whether coal is loaded by conventional or continuous methods, the shuttle car will be a very important mining tool."

Using western Kentucky mines for examples, W. L. Husk, chief engineer, West Kentucky Coal Co., analyzed shuttle-car haulage from these angles: (1) all-rail haulage with shuttle-car gathering, (2) all-belt haulage with shuttle-car gathering, and (3) panel belts and main-line haulage with shuttle-car gathering. Crew strength in a basic conventional mining unit may range from 12 to 22 men. Capacity per face man may vary from 30 to 50 tons per shift, not including timbering and supply handling, and capacity per unit may vary from 150 to 1,000 tons per shift.

The all-rail haulage and shuttle-car gathering mine is in 54-in No. 9 seam coal. Sixty-six men load 2,400 tons of clean coal per shift, averaging about 36 tpm. Units average 400 tons per shift. One method of facilitating the extension of the main line as a unit advances consists of using temporary light rail in two entries for development and following it up with heavy rail on well graded bed 1,000 ft from the face when time permits. The other method is to keep the main line rail close to the face. To remove light rail, install the heavy steel and extend the loading point 250 to 307 ft costs $1,200 or 3.4¢ per ton.

In all-belt haulage with shuttle-car gathering in 60-in No. 9 coal, 62 men average 43 tons per man-shift. The 30-in belts used in this mine are a handicap because the loading machine must be stopped while men break lumps to a size that will stay on the belts.

Mr. Husk pointed out several advantages of panel belts with main-line track

haulage and shuttle-car gathering, noting that several western Kentucky mines employ this combination in conventional mining. An important advantage is that regardless of seam irregularities direction of the main entries can be turned to suit. It is an ideal system for a property which is irregular in shape, long and narrow, and without severe grades.

Bridge Conveyors

"To bring about these lower costs, we had to increase productivity at the face through the more-effective use of equipment and reduction of delay time."

Peaks of 95 tons per man have been hit with Piggyback conveyors in the new Bufflick mine in the 4½-ft Coalburg seam, declared Myron Kok, assistant general manager, the Warner Collieries Co. Continuing, he said that 100 tons per man is possible and is just a step ahead. Time studies and industrial engineering techniques initiated in 1951 had indicated that in the new mine, opened in July, 1954, and in which the working force had been predetermined, 100 tpm was possible. In January, 1955, when Piggybacks were placed in a limited room-work area, performance ranged from 31 to 95 tons, with an average of 40.42 tons per face man.

In February and March, 1955, in spite of difficulties from slides, washouts and high water the mine averaged over 40 tons per face man and over 18 tons per man on the payroll. In the opinion of Mr. Kok the true productive potential of Piggyback operations in seams 4 to 6 ft thick has never been attained. Many operators got such large increases that a state of complacency set in. "When an honest effort is made by mine management, even in bad conditions, increases of more than 50% will be attained."

Loading to Cars

"A feature of this mine is its efficient haulage system."

St. Ellen mine of the Perry Coal Co., said John B. Harvey, chief engineer, and Joseph Johnson, superintendent, daily produces 5,000 tons of washed coal by mechanical loading directly into mine cars. This mine, 15 mi east of E. St. Louis and opened in 1903, is the oldest producing operation in Illinois. It employs a room-and-pillar system in which seam recovery runs 60%, and 8-ton drop bottom mine cars are used. A unit has 19 working places, and 19 men and a foreman comprise a section crew. All shooting is done off-shift.

Gathering for each of the four loading machines is done with two Greensburg locomotives equipped with Gould batteries. They handle one car at a time and deliver to an 8-ton cable-reel relay locomotive. Main-line hauls of 3⅛ mi from the south side of the mine and 2⅛ mi from the west section are handled by two 20-ton Goodman locomotives. Round-trip time with 32 to 35 cars on the 3⅛ mi haul is 32 min, and the dumping cycle takes 12 min.

Underground Power

"With the pressure of increasing costs in mining operations, it seems fitting that another look be taken at AC and DC systems, or even at mixing the systems."

Discussing AC and DC underground, W. R. Morton, application engineer, mining, General Electric Co., used curves and characteristic data to compare motor characteristics, torque, starting current and costs per horsepower for the motors and separate controls. Although much thought must be given to maintaining low reactance and low voltage drop in AC systems there are many points in favor: "(1) AC motors are about two-fifths the cost of DC motors, (2) 220-v AC control is just about equal in cost to DC control, while 440-v AC control is less than DC, (3) portable AC substations are less than 30% of the cost of DC conversion units, (4) maintenance of AC equipment is simpler, and (5) the AC system has greater versatility."

In regard to mixed AC and DC systems, Mr. Morton observed that consideration should be given to AC on new equipment. The mixed system is practical if due care is exercised in preventing the flow of DC stray currents in AC ground circuits. He presented drawings showing typical connections for mixed AC and DC power distribution.

Overburden Drilling

"The purpose of drilling is the blasted material resulting. We, therefore, regard the drilling coal per cubic yard of blasted material as a yardstick by which to measure drilling achievement."

Rotary drills, said J. Robert Bazley, president, J. Robert Bazley, Inc., are fast replacing old type churn drills in the deepening of completed anthracite strippings and the planning of new strippings to depths never before attained. At one mine, he noted, three types of drills have been used. The first, with a 9-in bit, gave, with a planned drilling pattern, 8.3 cu yd of blasted rock per foot of drill hole. Penetration was 9.7 ft per hr. The next, with 7⅞-in Hughes Tri-Cone rotary bit, gave a penetration of 39.2 ft per hr. The third, a Bucyrus-Erie 50-R unit with 12¼-in Hughes rotary bit gave a penetration of 66 ft per hr. Also, it has shown an efficiency of 95% in a year's operation. A new drill which the Bazley company has not used long enough to determine average results is the three-purpose Ingersoll-Rand "Drill Master" which can be provided with a "down-in-the-hole" percussion unit for a 6-in hole, an above ground percussion unit for 4½-in holes, or a 6¼-in Tri-Cone bit for rotary drilling. Another unit is a "Trac-Drill" with 600-cfm compressor and two 14-ft telescopic booms mounted on a series 8RD8 Caterpillar tractor. On each boom is an X71WD drifter using a 2½-in bit.

Down pressure and rotation speed are important in rotary drilling, said Mr. Bazley, noting also that larger bits seem to be more efficient. For example, the average footage for a 12¼-in diameter bit is 2,710 ft, compared to 982 ft for the 7⅞-in bit. But, he added, the work done by the small bit was more severe.

"One thousand feet of hole per shift seemed to be an almost impossible goal for blasthole drilling several years ago, Now, it is not uncommon to find several of the newer drills beating this goal every month."

A company-built rotary drill at No. 2 mine of the United Electric Coal Cos., Duquoin, Ill., is pushing down 8¾-in holes at speeds 8 times faster (870 ft per shift) than churn drills (90 to 120 ft of hole per shift), said Forbes R. Clarke, field superintendent. Thus, the one rotary drill has replaced seven churn drills. The triangular-shaped mast is over 90 ft tall and permits drilling a 78-ft hole without changing stems.

Auger stems with an overall diameter ¼ in less than the rotary bit are used to help bring the clay and cuttings to the surface. With a smooth stem a thick layer of clay above the shale and rock closed around and bound the stem. Average life of a Hughes 8¾-in-diameter bit on this job is approximately 6,000 ft and the range 2,000 to 14,500 ft.

A 50R drill able to go 32⅔ ft before an additional stem section is added has drilled 800 ft per shift in some areas. At the Dawson Springs (Ky.) mine of the company an Ingersoll-Rand QM2 Quarry-master drill that put down 6 to 7 60-ft 6¼-in-diameter holes per shift has been converted to a rotary using a 7⅞-in diameter bit. It now averages 700 to 800 ft per shift.

In conclusion Mr. Clarke also called attention to the new type Ingersoll-Rand "drill in the hole"-type machine weighing only 37,000 lb and putting down a 6¾-in hole faster than rotary-type drills. Features are absence of vibration; simplicity and compactness of all drill components; and the light but rugged frame and crawler units.

Auger Mining

"The augering of coal has shown a greater percent production increase than any method of mining—deep or strip—in the last 3 yr."

Coal produced by augering has risen 99.29% in the three years of 1952, 1953

and 1954, said Fred O. See, vice president, in a paper read by J. Littlepage, Cardox Corp. Recovery under favorable conditions runs as high as 65% and the average is in the mid 50's.

Citing augering case histories, Mr. See noted that cost at an Ohio No. 8 operation was $0.59½ per ton in the truck, made up as follows: labor, 10¢; fuel and bits, 7¢; maintenance, 16¢; pit cleaning, 10¢; and amortization, 16½¢. Investment was approximately $26,000; hole diameter is 42 in; auger sections are 6 ft; maximum depth of hole is 125 ft; and production per 8-hr shift is 250 tons.

With 32-in holes in the Darby seam, Harlan County, Kentucky, total cost loaded into trucks is 90¢ per ton, as follows: repairs and maintenance, 3.57¢; gasoline and oil, 13.76¢; insurance, 1.8¢; labor and supervision, 70.6¢. A complete auger operation in Kanawha County, West Virginia, achieves 19.185 tons per man, total payroll.

Mr. See summed up as follows: "(1) Augering is of age and should be considered as an integral part of a mining operation; (2) it is the most economical and at times the only method of recovering fringe coal; (3) it permits selective mining and produces a high quality of coal; (4) it produces a minimum of fine coal and sizing can be regulated through the use of different type cutter bits."

"Today many fringe coals are being recovered at a cost considered impossible a short time ago."

Several examples of augering with McCarthy coal-recovery drills were discussed by S. M. Poindexter, Salem Tool Co. In 32- to 36-in Pocahontas No. 6 coal, grindability 95, 8,625 tons was mined in January, February and March 1954. Holes were made with a 24-in auger, 6-ft sections. Average hole depth was 90 ft. Total cost hauled to the tipple was $2.96 per ton, as follows: total operating supplies, 40.1¢; hauling, 68.6¢; total labor, $1.046; depreciation, 41¢; overhead, 42.6¢.

Total cost at another West Virginia mine, No. 5 Block, 46 to 48 in thick, grindability 46, 36-in auger, 12-ft sections, was $1.29 per ton, as follows: total operating supplies, 28¢; hauling, 55¢; labor (payroll), 27¢; insurance, compensation, etc., 4¢; and depreciation (20%), 15¢.

"Only the auger has made possible the systematic mining of 'fringe coal' with an acceptable recovery and a high production."

Factors determining the size of machine and width of bench necessary in augering were among augering questions discussed by Quentin G. Bullock, vice president, Compton, Inc. For instance if it is desired to go 200 ft a Model 48 machine would be used. Being 48 ft long, it would ordinarily require a bench 60 to 65 ft wide to permit trucks to pass behind the auger. If width is a governing factor a crossover conveyor is available.

Most worked-out deep mine properties with outcrops that are augering possibilities have 50 to 150 ft of recoverable coal. In one instance, where seam thickness was 40 to 42 in and maximum required depth of hole was 150 ft, a Compton 28 machine with 30-in auger was recommended. This would work conveniently on a 35-ft bench and, if necessary, could be used on a 25-ft bench. Recovery rate was estimated at 30 to 35 tph. The actual average was 36 tph. The auger, Mr. Bullock concluded, is as essential in the recovery picture as the underground equipment. Both are needed for a high percentage of recovery in mining a property.

Akremite Blasting

"Proof that Akremite is past the experimental stage and is a definite success is found in the fact that over 10,000,000 lb has been used in 15 different mines in 10 states."

The sharing of new meritorious ideas with other companies is beneficial to the entire coal industry, said James A. Miner, president, Colonial Coal Mining Co., in discussing Akremite and the results attained with it at Colonial mine, near Madisonville, Ky. The use of Akremite accompanied the installation of a 50R drill a year ago. Results include an 18¢-per-ton reduction in drilling and shooting costs compared to a like period of 11 mo before the change. A 3-man crew drills and loads the holes in one shift, and the holes are shot at the end. This prepares overburden for a Bucyrus 9W and a Marion 7400 working around the clock.

Mixing the ammonium nitrate with carbon black is done at the mine in a 55-gal wooden barrel rotated at 18 rpm. With plastic scoops the material is loaded into polyethylene bags. A crew of two men mixing and filling bags can prepare about 6,000 lb in a 7-hour shift. To fire it in the hole a primer with a strength equal to 60% gelatin should be used. For a 300-lb charge of Akremite a 12½-lb primer is employed, and for each additional 200 lb, 12½ lb is added.

Questions from the floor brought answers that Akremite speed is 11,000 to 12,000 fps; that limestones 3 ft thick to 60 ft thick have been shot with it, and that an article in *Coal Age* (May, 1955, p 70) stated that at Robbins Coal Co., in Alabama, it has been found economical to use Akremite alone to move 20 to 30% of the bank to the spoil.

Two-Seam Stripping

"The coal industry is continually exploring methods to improve production to cut the cost of mining."

"Cutting the cost of mining coal was the goal in mind in 1950 when Mr. R. H. Sherwood's engineering department approached the problem of laying out a strip mine in a field of No. 2 and No. 3 coal in Williamson and Saline Counties, Illinois," said William W. Dukes, mine superintendent, Stonefort Corp. Both seams were extremely high quality for southern Illinois, but never had been mined in large quantities. Because of 6 to 17 ft of shale and sandstone separating the 36-in No. 3 from the 39-in No. 2 coal, they were considered as uneconomical to strip.

To make the operation economically feasible, a specially designed Bucyrus-Erie 1050-B shovel was designed to permit one shovel to strip both seams. Overburden drilling is done with Parmanco hydraulic-feed horizontal drills. Blastholes over the top coal are drilled on 20-ft centers and charged with 1 lb of explosives to 5 cu yd of rock. The interval between the seams is drilled on 25-ft centers and holes are loaded with 1 lb of dynamite to 7 cu yd of material.

Mr. Dukes said estimates of operating and maintenance costs indicated that about 10¢ per ton could be saved by using belt conveyors and small trucks as compared to using all-truck haulage. As a result, smaller trucks and belts were selected for coal haulage. A 5,000-ton raw-coal stockpile assures a constant flow of coal to the preparation plant when there are delays in the pit and permits haulage from the pit to continue when there are delays in the tipple.

There are 101 men employed at the mine, including 85 production workers and 16 company men. Output per production worker has averaged 31.4 tons per man-day for the last 8 mo. The best productivity was 34.5 tons per man-day in February 1955, Mr. Dukes said. A detailed description of this mine appeared in *Coal Age*, August, 1954, p 65.

The Wheel Excavator

"The coal-stripping industry has been looking for other methods by which the overburden could be moved more efficiently and at less cost."

"It has been proven that when the upper strata of overburden consists of loam, clay, sand, gravel, hardpan or shale, and if there are no boulders present so large that they cannot be safely loaded onto or transported by belt conveyors, the wheel excavator, working in tandem with a shovel which strips the lower and usually harder strata, has met all the requirements as to reach, output and economy of operations," said Gene Long, mine superintendent, Truax-Traer Coal Co.

This type of machine stands on the coal like a shovel, moves on crawlers, and the mounting with base and revolving frame is similar. While the shovel digs intermittently, the wheel excavator has a number of small dippers and digs continuously while swinging across an arc of the highwall. It loads onto belt conveyors which carry the material continu-

ously to the spoil area where it is dumped over a large arc, Mr. Long explained.

All this results in uniform application of relatively small forces requiring even, steady power and thus eliminates high and expensive peak loading of the power lines. It also results in even loading of the machine's structure and various units, thus reducing the damaging effects of peak loads. Hence, long life and low maintenance should result, Mr. Long declared.

The Truax-Traer wheel excavator is the first such unit designed exclusively for wheel service. It can dig from a minimum of 29 ft above the coal to a maximum of 75 ft above the seam. With a highwall slope of 2 to 1, it will dig a shelf better than 50 ft wide. Maximum reach from digging bucket lip to head pulley of the stacker conveyor is 350 ft. Height to the top of the stacker head pulley above the coal is 112 ft with the stacker inclined 15 deg. Working weight of the machine is 2,500,000 lb, Mr. Long said.

The 22½-ft digging wheel is fitted with nine buckets. Each bucket has four teeth, spaced on the lip to produce proper slicing of the material. Buckets are fastened to the wheel by two pins and four bolts which, when tightened, wedge the buckets firmly to the wheel. Thus buckets can easily be removed and replaced with spares when repairs are needed. Therefore down time for bucket maintenance is kept to a minimum, and bucket repairs can be made in the shop where better quality work can be done, Mr. Long explained.

An interesting feature of the wheel is the application of heat to the buckets during exceptionally wet or cold weather. A compressed-air-fed gun-type oil burner mounted on the digging ladder directs a flame at the buckets from a distance of 6 ft 8 in. Calrod heaters also are provided to give additional heat, Mr. Long declared.

The machine has three-man crew consisting of an operator, oiler and a ground man. Operating controls are in the operator's cab located in the superstructure 60 ft above ground. From this elevation, the operator has an excellent view of the work area, Mr. Long pointed out.

Strip Haulage

"With upwards of 100 million tons being hauled yearly, production coal haulage is worth a good hard look at the methods and equipment."

"Since the capacity and type of equipment vary from mine to mine, it is necessary to match all the equipment to provide the most efficient operation. This is especially true in selecting equipment for hauling coal," said H. A. Raivio, special representative, Sales Div., Caterpillar Tractor Co.

Improvements in design must pay for themselves in better performance and each phase of the hauling cycle must be taken into consideration. By reducing the time in any phase in the cycle, lower cost per ton-mile can be realized, Mr. Raivio explained.

It is important to keep overall height of the truck low so that it makes an easy target for the loading shovel. By keeping over-all length a minimum and width a maximum, a faster loading cycle results, Mr. Raivio added.

The available horsepower and gross weight of the vehicle must be in balance. A high horsepower-to-weight ratio will provide more available pounds of rim pull for negotiating grades at higher speeds. This increase in horsepower-to-weight ratio will require the development of power-train components to withstand increased torque and wear. Constructing trailing units of high-tensile steel or aluminum to reduce the over-all weight will increase the weight-horsepower ratio, Mr. Raivio declared.

Ease of operation is of prime importance to reduce operator fatigue and boost efficiency, should be considered in the selection of tires, power steering, location of controls, visibility, type of seat and cab design. The operator who likes the comfort and ease of operating a machine will make more trips per shift, Mr. Raivio explained.

In the designing of future haulage units, greater consideration will be given to horsepower-to-weight ratio, capacity, maneuverability, maintenanuce, ease of operation and other factors to secure better over-all machine performance. Design changes and improvements in basic components will be reflected in better operating performance and lower cost per ton, Mr. Raivio concluded.

"Teamwork between the truck manufacturer and coal operator is necessary for increased profits to the coal-mining company."

In truck application, said Ralph H. Kress, executive vice president, Dart Truck Co., the manufacturer must get from the operator such data as length of haul, grade and size of loading shovel. He should see if the physical layout of the mine lends itself to circle haulage or whether haulage equipment must be turned in the pit, he said.

Road conditions are an important factor and grades on permanent roads should be kept to a minimum. Roads should be well drained to prevent formation of soft spots, especially if the truck is equipped with a standard transmission, Mr. Kress emphasized.

If the truck is properly engineered, a torque converter is used and the engine torque converter and rear axle ratios are properly matched with the road, then the operator can expect better performance and lower operating costs, Mr. Kress explained.

Progress in more efficient truck haulage means a well-engineered truck to fit a specific haulage operation. By equipping a truck with a good diesel engine, a torque converter and a husky rear axle built to take a lot of torque, the operator will have lower haulage costs, Mr. Kress said.

"The general tendency in stripping is toward a larger-size hauling unit."

New trucks going into service are in the 40- to 50-ton class as compared with the 25- to 40-ton size delivered previously, observed Alan S. McClimon, manager, Sales Development, Euclid Div., General Motors Corp.

Studies indicate that given suitable roads, loading conditions and space to work in, haulage costs are progressively downward from the 25- to the 50- to 55-ton size and then begin to rise again when 75-, 100- or 125-ton units are considered. This appears true even if an attempt is made to maintain existing power-to-weight ratios and assuming no higher purchase price per pound of vehicle weight, Mr. McClimon explained.

A torque converter is well adapted to the anthracite field with its steep pits, variable grades and loads. Where excessive maintenance is encountered with the conventional clutch and transmission because of severe service, the torque converter drive has provided longer transmission life and some improved engine life, but at the expense of higher fuel consumption and, in some cases, increased brake lining cost. In more level, long distance bituminous hauls, the torque converter at the present stage of development does not necessarily give more economical haulage costs, Mr. McClimon declared.

Improvement could be made in applying the torque converter and its semi-automatic transmission to bituminous coal haulers. There should be an increase in the number of gear splits in the semi-automatic transmission. This would permit a higher ratio range to enable the unit to pull out of the toughest pit and at the same time achieve a top speed of about 40 mph. Future transmissions should probably have five to six speeds, Mr. McClimon said.

Nylon fabric, tubeless tires and specially designed tire treads for better heat dissipation are definite steps toward better tire life. High pressure tires are more subject to cutting, to breaks in the fabric and to ply separation. Therefore, going to more plies and higher pressures is the quick answer to the problem of getting longer tire life, Mr. McClimon explained.

"It is easier, safer, more economical and common sense to adapt current equipment to special application and then make progress by a program of improving the bits and pieces."

With gross vehicle weights of 150,000 to 176,000 lb moving on mine roads at speeds up to 40 mph, there is not much margin for cost and safety, declared Hoyt W. Smith, chief engineer, Equipment Sec., LeTourneau-Westinghouse Co. It is possible that bigger loads and slower speeds should be considered. A 75-ton load moving at 10 to 12 mph with

an empty speed of 25 mph compares very favorably with a 50-ton unit moving at a fairly high shock-load-producing speed, Mr. Smith explained.

Speeds beyond those now available do not seem economically reasonable and somewhat slower speeds could have some desirable end results. In final analysis, Mr. Smith said that it appears that payloads must get bigger or industry must sweat out the slow process of engineering longer life into all the parts and face the pyramiding problems involved with still higher speeds.

Heat-Drying 5/16x0 Raw

"Heat drying is an essential component of the Crown mine preparation plant where it improves the efficiency of dry cleaning and upgrades the Btu value of the coal."

A Link-Belt Multi-Louvre drier at Crown mine handles 175 to 180 tph of 5/16x0 raw coal, reducing surface moisture from about 6% down to 1 or 2%, Emery Milligan, preparation engineer, Freeman Coal Mining Corp., pointed out in his review of fine-coal cleaning practices at Farmersville, Ill. Total drying cost is 15.15¢ per ton, including amortization of capital investment, and operating and maintenance costs.

The figures are based upon 3 yr experience with the Multi-Louvre plant, Mr. Milligan reported, in which time the operation has been relatively trouble-free in turning out a uniformly-dried product.

Briefly, the processing at Crown plant consists of hand-picking the plus 6-in lump, washing 6x1½ in an 8-cell 3-compartment Jeffrey Baum-type jig, and cleaning the minus 1½-in on Roberts & Schaefer Super Airflow tables.

In the dry plant, the raw feed is split into 1½x¾, ¾x5/16 and 5/16x0. The latter is dried in the Multi-Louvre. The drier product then is split at 10-mesh, and these two fractions are cleaned over separate air tables. The 5/16x0 reject from the dry plant is returned to the jig, where it acts much in the manner of a "dense medium" to increase total coal recovery and contribute to product uniformity, Mr. Milligan explained.

Returning to his major theme, heat drying, Mr. Milligan reported that up to Dec. 31, 1954, the unit had proccessed approximately 1,020,000 tons. Recent tests of cleaning performance in the 5/16x10-m show that when the drier is bypassed the coal shows a 2.2% reduction in dry ash and a Btu improvement of 250. With the drier operating, the dry ash reduction is 5.3%, Btu improvement is 850. Tests on minus 10-m coal show similar results.

It has also been found that the tonnage of 5/16x0 can be increased 25% when the coal has been predried to uniform moisture content. R-O-M moisture varies from day to day and among sections.

Cleaning Fines for Competitive Marketing

"Since the bulk of the carbon coal is sold to public-utility generating plants which, as a rule, base their purchases upon some modification of the 'cents per million Btu' formula, uniformly high quality is essential if regular shipments at profitable price levels are to be maintained."

The foregoing is one of the main guiding principles in the design and operation of Leatherwood Plants Nos. 1 and 2, the latter placed on the line in October, 1954, said J. E. Tobey Jr., industrial sales engineer, Blue Diamond Coal Co. Co-author with Mr. Tobey is J. D. Snyder, mining engineer.

The newer facility, Leatherwood No. 2, was designed and erected by McNally-Pittsburg, employing two McNally Tromp dense-media washers for 14x2 and 2x½ and Deister SuperDuty Diagonal-Deck tables for cleaning minus ½-in. This equipment was specifically chosen to handle high-ash, middle-gravity rashings appearing in the seam in the area of operations of Leatherwood No. 2.

In a detailed report on the fine-coal circuits, Mr. Tobey described how the raw ¼x0 is sluiced from the raw-coal vibrator to a settling tank which provides a surge capacity of about 15 min, smooths out reject surges, conditions the fines for wet-table treatment and deslimes the feed.

The material is discharged from the tank to a distributor which serves eight tables with about 10 tons per table per hr. Washability studies show that this material presents a "formidable" problem, Mr. Tobey said.

The clean ¼x0 is split into sizes which can be effectively dewatered ahead of the thermal drier. Drying includes screening, centrifuging in a McNally Dryclone and drying in a Multi-Louvre. Resulting maximum surface moisture is 2%, and the coal is returned to the loading section for blending or separate loading.

Noting that operations have been held up by the L&N strike, Mr. Tobey reported that the plant is expected to perform up to its designed features, and experience to date bears this out.

In formal discussion, F. P. Calhoun, assistant production manager, Rochester & Pittsburgh Coal Co., pointed out that both the Crown and Leatherwood plants had been designed to handle a specific coal, the only proper course to take. Plant design should be based upon complete washability studies and upon reliable information with regard to water supply, refuse-disposal needs, stream and air pollution regulations and so on. Estimates of operating costs should be compiled, since it can very easily happen that cleaning costs cannot be recovered from the market price of the cleaned coal, Mr. Calhoun warned.

The trend in design of coal-burning equipment, Mr. Calhoun said, is toward burning cheaper, higher-ash, lower-Btu coals; the trend in mining is toward continuous mining which generally means more fines and more impurities in the raw coal. The expected trend in processing plants, therefore, is toward 100% cleaning and drying of all fine coal, and air-cleaning will continue to be one practical solution.

Offsetting Delays

"The lack of raw-coal storage between the mine-car dump and the washing plant required a cleaning unit that could be started up or shut down with least loss in cleaning efficiency and operating time, and in view of the intermittent operation caused by 'no coal' delays these two points were very important."

Primarily for these reasons, a selection of wet tables was made by designers of the preparation plant of Mathies Coal Co., according to David G. Werner, preparation plant foreman. Previous study of table plants showed that by having positive control of raw-coal feed and dilution water, it was possible to start and stop the tables with but a slight loss in cleaning efficiency. The tables are stopped simultaneously with shut-off of feed and dressing water, and thus the beds are not washed from the tables.

Furthermore, the tables and the solenoid valves controlling dressing water are remotely controlled through a master starter, and the entire group of tables can be started in 15 sec and stopped instantaneously. Therefore, the coal and refuse beds are stopped on the spot when feed is shut off. In starting up, the dressing water is turned on an instant ahead of the feed, and the tables resume operation as if they had not been stopped, Mr. Werner explained.

Lack of coal-storage facilities also made it mandatory to have sufficient capacity in the water-conditioning units to eliminate operating variables resulting from high solids content.

The water circuit for the Deister table plant therefore is equipped with sludge tanks for both refuse and clean coal, and overflow of the refuse tank, with minus 150M solids, is further clarified in a 75-ft Dorr thickener.

The Mathies plant is well equipped for handling fine coal, having sufficient dry screening area for raw coal, adequate dewatering and centrifugal drying capacity, and a water system capable of properly controlling solids content of the circulating water, Mr. Werner said. Performance has been satisfactory.

Silt Recovery

"Of primary importance to the successful operation of the Jeddo plant is an adequate

supply of water capable of sustaining plant operations even in long dry spells."

The answer to this one is found in creating an underground reservoir having an estimated capacity of up to 200 million gal. In a detailed description of the Jeddo layout, H. R. Middleton, sales manager, Wilmot Engineering Co., explained that the plant recently was completed as a facility of the Jeddo-Highland Coal Co. for the purpose of working over some sludge deposits laid down in the Jeddo, Pa., area for many years. There is sufficient material in the deposits to support operations at the plant for at least 10 yr. Present rate of production is about 120 tph of Nos. 4 and 5 coal, Mr. Middleton said.

No. 4 coal is cleaned in a 7-ft Wilmot cone cleaner and No. 5 in a 16-ft Wilmot classifier. The raw feed, which is pumped to the head of the plant circuit, is split into these fractions on three stationary launder screens.

Underflow of the launders is cleaned in a bank of flotation cells after conditioning in a Denver-Turrall conditioner. This latter unit is equipped with a conical bottom and interior baffle plate to effectively separate high-ash impurities and concentrate them at the bottom of the tank for air ejection.

Turning to the subject of water conservation, Mr. Middleton pointed out that all efforts have been made to bulwark the primary underground supply. For example, overflow of a Dorr 26-ft Hydroseparator, which eliminates minus 200-mesh fines from flotation feed, may be diverted from the overflow launder and returned to the main feed sump. Effluent from cyclones which perform the initial dewatering of flotation coal may be diverted from refuse to the flotation feed sump and so on. Also, surfaces under the loading tracks have been graded and paved to return drainage of the cars to the plant-feed sump, and firehose facilities have been provided to permit washing down these areas for recovery of the solids. A full description of the Jeddo plant appears in *Coal Age*, November, 1954, p 96.

Foremanship

"You've got to have good supervisors, because the section foreman has his hand in the company's pocket."

The increased pressures on the present-day foreman, the additional training and knowledge required of him, and the value of equipment for which he is now responsible make for new problems in foremanship evaluation which higher management cannot ignore, said E. B. Leisenring Jr., assistant to the president, Stonega Coke & Coal Co. He cited four possible benefits from information developed through foremanship evaluation surveys:

1. To bring out any unfavorable personality situations at the mine which may be otherwise unnoticed or underestimated.

2. To discover obstacles confronting the individual foreman which may be overcome by helpful advice or further training.

3. To bring to higher management's notice men of above-average potential, who might otherwise go overlooked.

4. To make mine management, section foremen and their superiors alike aware of the increasing importance of the qualities of foremanship.

Preventive Maintenance

"The trick about an effective program for preventive maintenance lies in establishing procedures and creating enthusiasms which will insure that the program is strictly carried out."

Excessive maintenance and replacement costs, and production losses due to avoidable breakdowns, can be prevented by a scheduled maintenance program which foresees the failure of components and insures correct preventive action. Continuing, H. H. Fraser, managing director, and H. E. Hastings, director, H. H. Fraser & Associates, Ltd., Johannesburg, stated that a properly conceived maintenance program must have these features:

1. It must indicate sufficiently in detail what is to be done.

2. It must specify who is to do it.

3. It must say how long the job should take.

4. It must provide a specific check that the job was actually done.

5. It must provide an incentive to encourage the carrying out of the job.

6. It must provide a penalty for failing to carry out the job.

Since good maintenance cannot be achieved if shop capacity becomes a bottleneck, the control of shop work is a necessary corollary to the development of an effective preventive maintenance program. The results expected of these controls are an increase in shop productivity, the completion of jobs in their correct order of priority, the gearing of the shops to maintenance requirements, and a reduction in costs.

Upping Efficiency

"Industrial engineering, applied with all its strength at mines, can be the best secret weapon for cost reduction."

Industrial engineering measures and calls the turn on how human effort can be best used, declared T. M. Barry, industrial engineer, Barry & Co. One part of the success of a good industrial engineering program is based on the fact that management knows from day to day what really makes up a fair day's work for each of its men and can then intelligently enforce these standards.

The other part of a successful program is planning work. Coal companies have found that basic time data gives them a double boost by helping them plan the best way to distribute work.

Mr. Barry cautioned that the basic time-data system should set basic standards for mining work by breaking the work into small but realistic elements. The important characteristics of these elements is that they vary independently from each other. For example, one logical element in timing a cutting machine would be "tramming the machine to the next place." The time for this element is a direct variable of distance. It takes twice as long to tram a machine 400 ft as 200 ft. In building the basic time standards the time for tramming various distances is recorded and plotted graphically. Before too long, the exact time is measused in feet per minute under, perhaps, three or four sets of conditions.

"I have, personally, not seen one coal mining operation, whether it be stripping, augering, mechanical mining, continuous mining or even hand loading which cannot be made more efficient through sensible use of these tools of management," Mr. Barry said. "And these results need not be confined to engineering the work of the men who mine the coal. They work just as effectively in measuring the work of all the other men who make up your organization.

Explosion Prevention

"A careful analysis of the experience over the past years indicates that the most likely place where gas explosions and ignitions will occur is in the slightly gassy mine or the mine in which methane is found only on rare occasions."

Fatality records of the past few years show that coal mine explosions are becoming one of the lesser causes of deaths and injuries in coal mines. The ultimate solution, as seen by M. J. Ankeny, safety director, Bituminous Coal Operators Association, must come from an awareness on the part of management and employees of the remaining hazards and a determination to do the things that are necessary to bring them under control. Based on a careful study of coal mine explosions and ignitions over the past 2 or 3 yr, the following practical steps for their prevention are suggested:

1. Determine for sure whether or not there are any standing bodies of gas in mined-out or caved areas. If it is impossible to remove gas by means of positive ventilation such areas should be sealed as soon as practicable.

2. Check up on gas inspection procedures to make sure that pre-shift and on-shift examinations for gas are being made in accordance with prescribed procedure.

3. Endeavor to improve and modernize the ventilation system as circumstances permit, with a view to the elimination

of all sources of arcs, sparks and flames from face areas and return air.

4. See that the air current is maintained as close to the working faces as is reasonably practicable.

5. Maintain the explosionproof integrity of all permissible machines through a well-planned maintenance program.

6. If explosives are used see that they are stored, transported, handled, charged and fired in an approved manner.

Training Benefits

"Accident records prove conclusively that properly conducted 100% training can and will reduce accidents."

The history of safety in the coal mining industry reveals that legislation with its enforcement powers, elimination of hazards, posters, slogans, rule books and departmental bureaucracy has only resulted in making a dent in the coal mine accident problem. Witness the fact that the frequency rate remains at 50.0. Yet more than 90% of the accidents which occur year in and year out are really preventable. Only when training is coupled with legislative and bureaucratic edicts are real results obtained, contended J. B. Benson, director of safety, Southern Coal Operators' Association.

To be successful the training should include first-aid and the USBM 20-hr course for every man on job—top management to newest employee. The USBM 40-hr course should be taken by all supervisors and key men. Refresher courses or follow-up training should be conducted as it becomes available.

What has been accomplished at almost 100 mines through 100% accident training can be accomplished at 1,000 or 5,000 mines. It must be remembered, too, that once interest in real safety has been developed through training, that interest must be transformed into positive, progressive action. Lip service alone will never develop into action.

Safety Jointly

"Probably no other state can use our safety plan, but it could be adapted to a company operating a number of mines, or it could be used by a group of mines in a small area."

The Indiana Joint Committee for Coal Mine Safety, appraising the record of mines participating in its 17-mo-old safety program, points with pride to these achievements: (1) accidents in the past year have declined almost 50% and production of coal has increased about 10%, and (2) a year has gone by without a fatality in a mining area where, in previous years, the death of one miner per month was expected.

Howard T. Batman, general manager, Lynch Coal Operators' Reciprocal Association, Terre Haute, Ind., said the committee's whole plan might be summed up this way: It is a joint effort between employees, management, and state and federal mine inspection authorities to keep a definite safety program going all the time. In seeking a solution to the accident problem, representatives from the above-named groups meet monthly for these specific purposes:

1. To discuss specific and general problems involved in making shaft mining operations safe.

2. To devise a practical and continuous education program on safety practices.

3. To promote accident-prevention training, first-aid programs, mine-rescue training and accident-prevention contests.

4. Analyze mistakes which had produced accidents and use this knowledge to prevent their repetition.

Roof-Fall Hazards

"Overcoming the No. 1 killer of mine workmen [roof falls] will require more than lip service. It will require acceptance of each one's personal responsibility, elimination of mental lapses, application of available knowledge, and a firm determination every working day that these unnecessary accidents shall be substantially reduced."

In general, suitable roof-control standards have been established, but the records show that these standards are not rigidly followed, observed J. J. Forbes, director, USBM. The outstanding but frequently neglected safeguard that should be auxiliary to every plan for roof control is to provide temporary roof support at each working face as soon after blasting as practicable, regardless of seemingly good roof conditions. It is important to consider each portion of newly exposed roof as dangerous. Every reasonable precaution should be instituted to support roof promptly by temporary means until permanent support can be installed.

Special effort is needed to prevent accidents from roof-falls in smaller mines (employing less than 15 men underground), where records show the frequency rate to be almost six times greater than in larger mines. Such effort should include better supervision and better education of workmen on how to reduce the hazard of roof, face and rib.

Year after year over 50% of the fatalities and about one-fourth of the serious nonfatal injuries in coal mines are caused by roof falls.

The Safety Act

"The cooperative and persistent efforts of all concerned in the protection of human life can and will be mobilized under the Federal Coal Mine Safety Act for even greater coal mine safety in the future."

The impact of recent board discussions on the program for greater mine safety was reviewed by Edward Steidle, chairman, Federal Coal Mine Safety Board of Review. He noted that unanimous decisions had been rendered in 9 out of 10 cases that have come before the board between its inception in July, 1952, and March 31, 1955. This remarkable unanimity of action reflects a studied and sincere effort by the board to reach sound and equitable interpretations of the Federal Coal Mine Safety Act in line with the intent of Congress. Mr. Steidle said the board is pleased to play its part in the effectuation of an act, during the nearly 3-yr existence of which there have been only two disasters.

The UMW Program

"The well-being of the men who mine the nation's coal is as important today as it ever was and it is our moral responsibility to see that no other factor takes priority over this acknowledged truth."

The United Mine Workers, declared Charles Ferguson, safety director, will continue to use every means at its command, including more stringent legislation, if necessary, to bring accidents in the coal-mining industry to an absolute, irreducible minimum. "We ask for and plead for the cooperation of the industry in this never-ending struggle, and express the hope that those who have not yet joined us will do so without further delay."

Safety Education

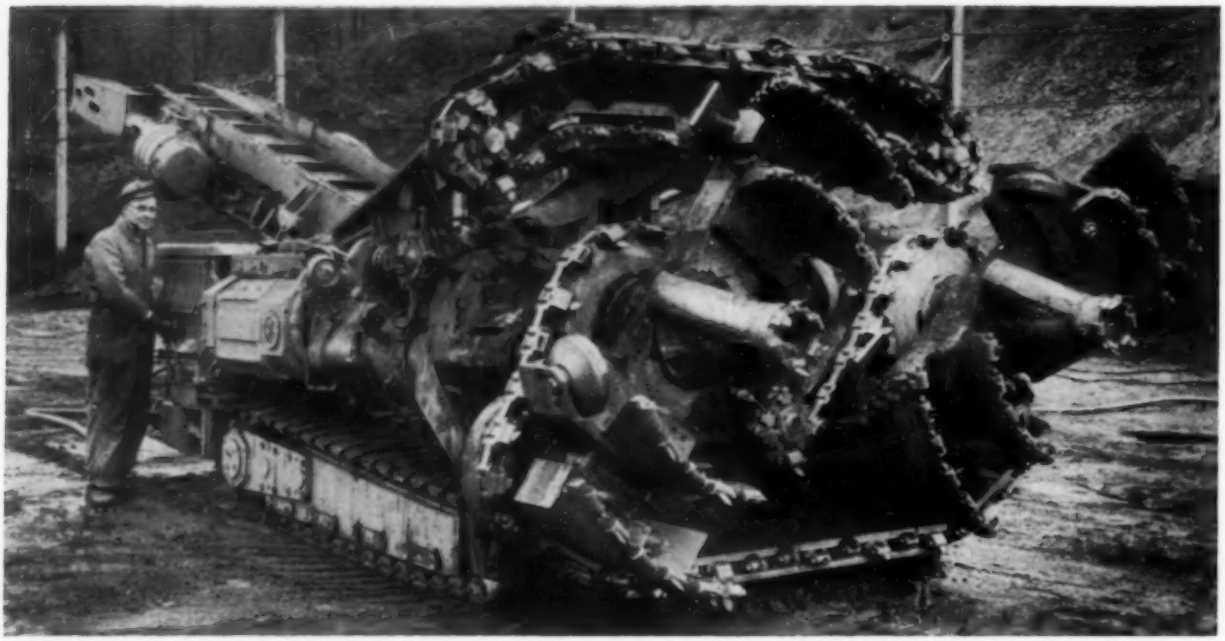
"Education and training are the most effective forces available to make mines safer places in which to work."

When the foreman is equipped with practical common sense and is properly trained in the use of safety equipment, he is equal to the task of safe supervision of workmen. This approach has been a keynote of a successful safety program at the coal mines of The Colorado Fuel & Iron Corp., said Thomas Allen, chief inspector of coal mines, Colorado. The mines of this corporation have won innumerable Holmes safety awards for operating without fatalities and lost-time accidents over a period of 20 yr.

Mr. Allen also stressed the importance of developing methods to maintain the miner's interest in his self-improvement as a safe worker. One technique suggested was to keep continued contact with miners through brief, simple pamphlets and circulars, or even a small magazine. This literature could be distributed by mail, union organization or pay envelopes.

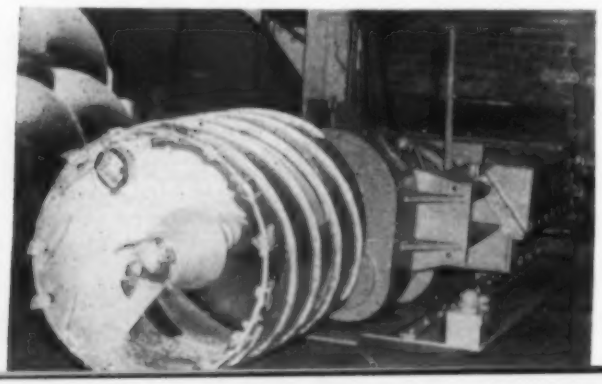
New Products Highlight AMC Coal Exposition

Higher mining efficiency and lower costs keynoted the exhibits of some 225 manufacturers and suppliers at the American Mining Congress Coal Show in Cleveland last month. This round-up of the new equipment and materials is an added feature of Coal Age's "Show Report," based on a booth-to-booth check by our editors. A complete listing of the show exhibitors and the major products or services displayed appears on pg 110-116 of this issue.



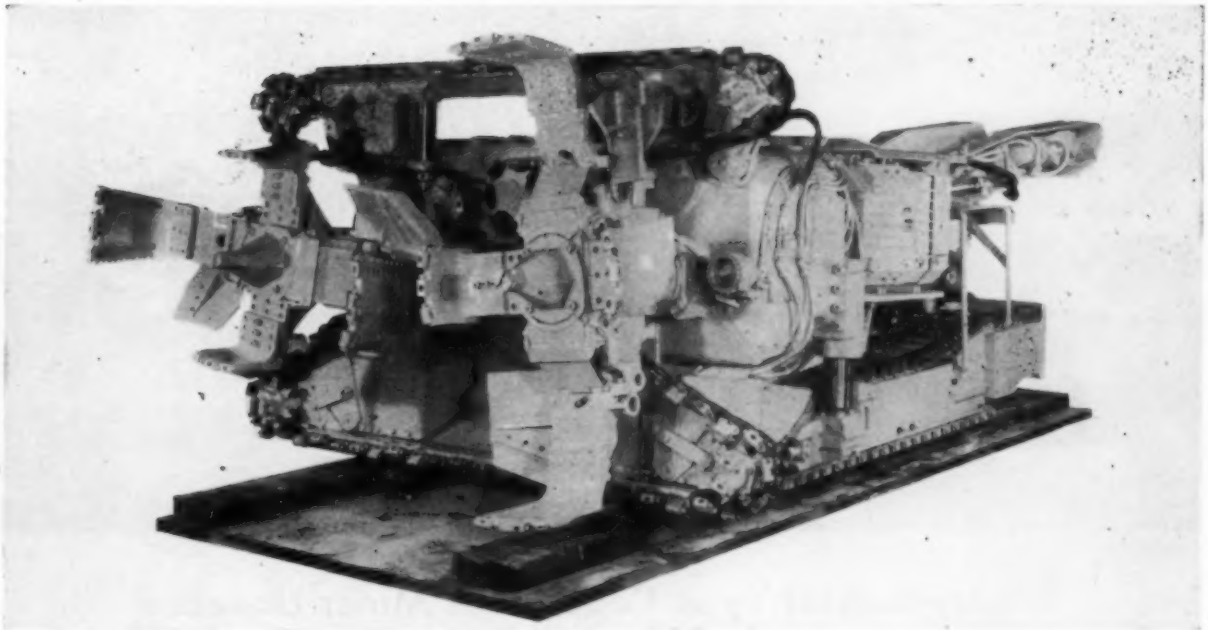
Easily Maneuvered, Full-Face Miner Loads 8 TPM

The new Joy TM2-1 "Twin Borer" is a boring-type miner designed for high tonnages in the higher seams of coal, cutting and loading a full face at the rate of 8 tpm. The crawler-mounted unit has two boring arms and two sets of trim chains which cut an arched shape for roof control, and the cut varies from 5 ft 11 in to 7 ft 11 in high and 11 ft 8 in to 12 ft 8 in wide. The TM2-1 bores at a rate up to 4½ fpm, trams at up to 22½ fpm, and all cutting surfaces retract hydraulically for roof and wall clearance. For adaptation to a wide range of conditions, boring-arm diameters can be changed in 4-in increments from 6 to 7 ft and the upper trim chain is adjusted to cut variable heights from tangent to 12 in above the boring arms. The sturdy main frame, pivotally mounted at the rear, can be hydraulically raised or lowered and tilted to each side to properly follow the coal seam, the company says. Bulletin C-52 from Joy Mfg. Co.



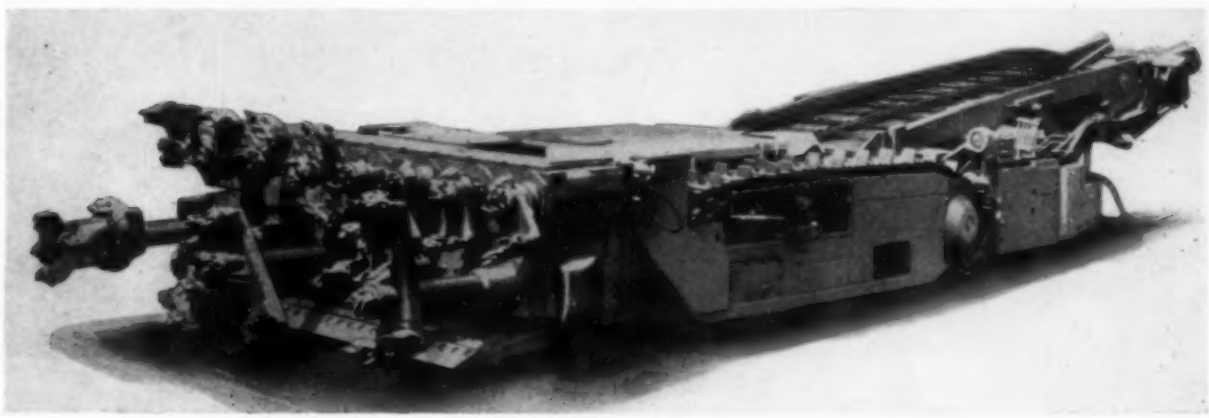
Underground Auger Features Adaptability

The new McCarthy coal recovery drill for underground use, made by Salem Tool Co., is designed to handle auger sections up to 36 in in diameter and 4- and 6-ft lengths with the over-all length of the machine depending upon the width of the mine opening. Reportedly the most compact machine of its type offered, the unit may be used to drill out pillars, drive air courses, relieve bumps and recover coal from under poor roof. Power is provided by a compact 50-hp permissible motor for hydraulic feed, hydraulic leveling and hydraulic roof jacks, and the unit may be supplied with or without rope drums for moving from place to place.



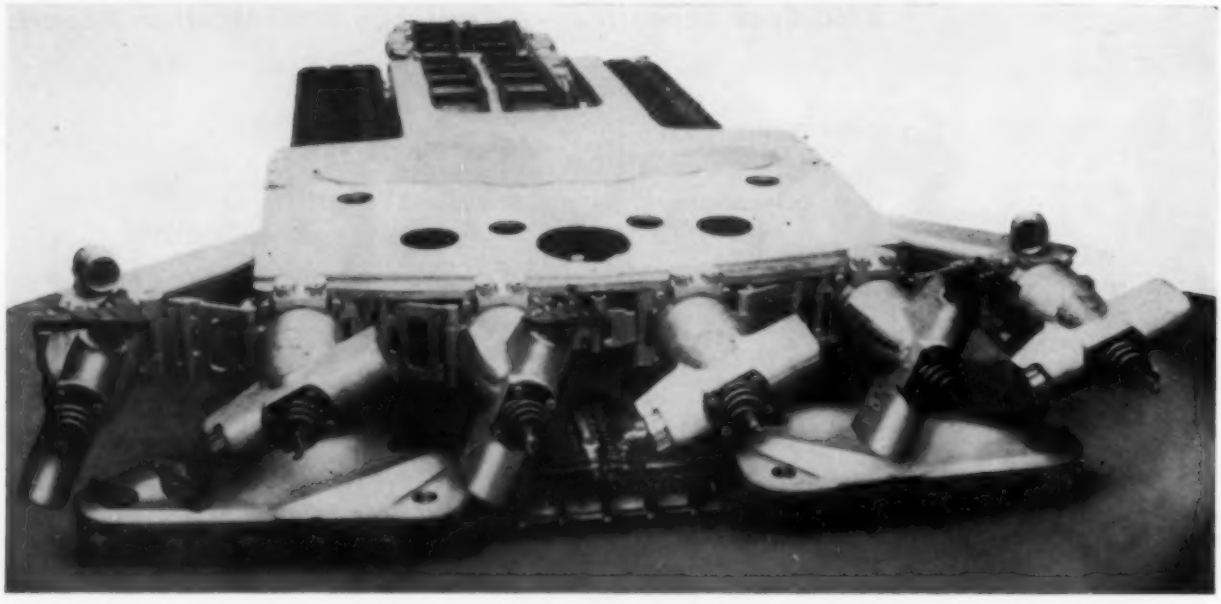
Boring-Type Continuous Miner for High Tonnages

The new Type 400 Miner is one of a series of Goodman boring-type continuous machines, cutting and loading from a solid seam at a rate upwards of 6 tpm and advancing continuously without swing or maneuver. Rapidity of advance that reduces cost of installing and maintaining auxiliary services, strong and simple construction with relatively slow moving parts providing low maintenance and long life, and adaptability to concentrated working areas requiring less manhours and supervision, are among the features offering substantial savings in cost cited by the company. The Type 400 Miner is available for cutting heights of 6 ft up to 7 ft, with cut widths of 11 ft 10 in and 12 ft 10 in, respectively. In operation, the entire cutting element can be raised, lowered or tilted to compensate for seam irregularities and the cutting units can be retracted to provide tramming clearance at the top, bottom and sides. Catalog G-107 from Goodman.



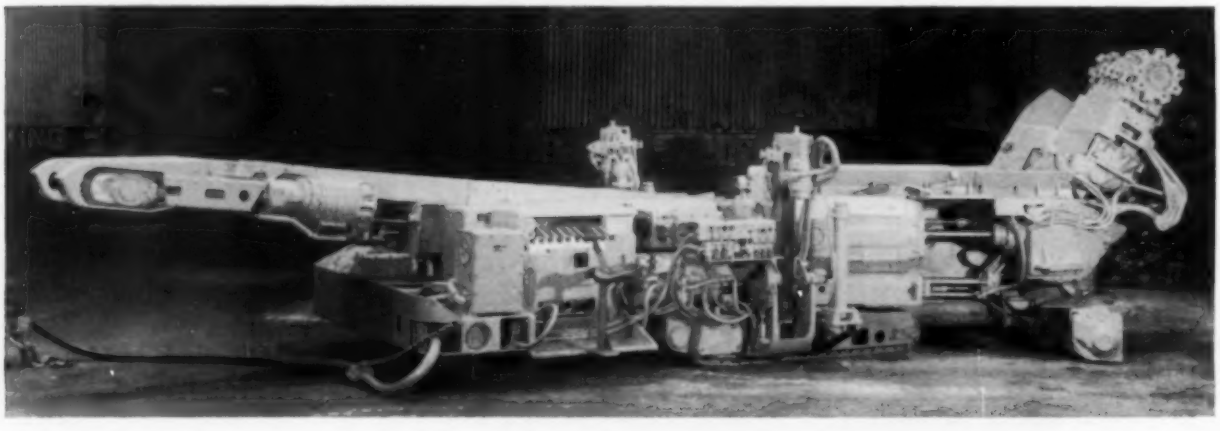
Higher Operating Efficiency for Continuous Miner

The 76AM "Colmol" continuous mining machine shown by the Jeffrey Mfg. Co. incorporates a number of design and operating improvements that increase the proven capability of previous models for high production, economy and safety, the maker reports. The 76AM is available in three heights of 36, 40 and 42 in, for mining heights of 38 to 54 in, cuts a path approximately 9 ft 8 in wide and has a mining speed of up to 46 in per minute and a tramming speed up to 23 fpm. Among the latest improvements cited by Jeffrey are a newly designed mechanically driven head; improved loadability for handling larger coal through the throat; modification of hydraulic circuits for better control; additional discharge conveyor; dual operating controls and relocation of equipment for easier operation; and more accessibility for maintenance. The 76-B Colmol, designed for seam heights from 46½ to 72 in, also features certain design improvements for higher performance, including an improved swinging discharge conveyor, the maker says. Catalog 877 from Jeffrey.



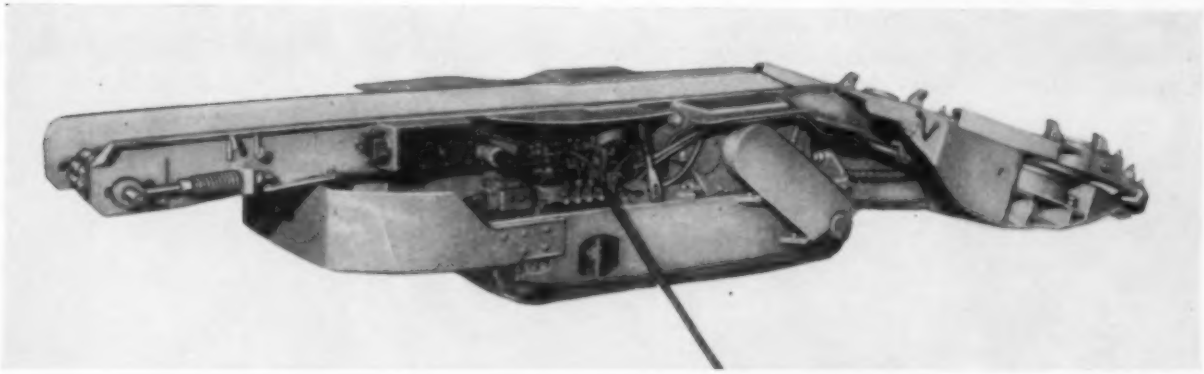
Rotary-Burster-Type Continuous Miner Unveiled

"Hydra-Miner," manufactured by Cleveland Rock Drill Div., Westinghouse Air Brake Co., employs the rotary mining heads originally developed by BCR in a machine having a 17-ft mining width, 9-ft tramming width, 38- to 52-in mining height and 32-in tramming height. All motions are mechanically driven except the crawler drives, which are hydraulically operated to provide infinite tramming speeds. Major design features are: few nuts and bolts in minimum number of sizes, no internal nuts and bolts to vibrate loose and cause failure, complete grease type lubrication to eliminate all oil seals, minimum number and types of hydraulic hose, and a high repetition in parts to permit an operator to service a machine from a small parts inventory. The structure of the 35-ton unit is made of high-quality steel castings and contains working parts machined to close tolerances to insure interchangeability. Ground clearance is 6 in, conveyor width is 36 in, crawler width is 24 in and overall length of the machine is 27 ft, excluding the tail boom. Motors total 216 hp.



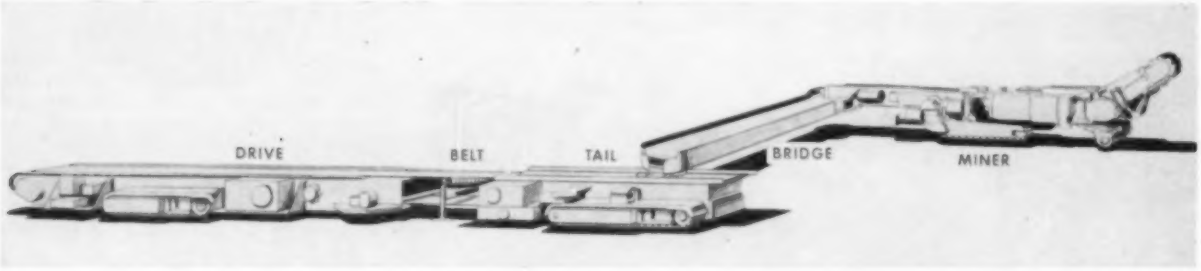
High-Tonnage Miner Cuts up to 90 In

The New Joy 1CM-2 continuous miner was designed for high tonnage production in higher seams of coal. It is 45 in high and has a cutterbar range up to 90 in above the floor and an approximate capacity of 4 tpm. The unit features extra heavy duty construction throughout; a 42-in-wide cutting head equipped with the new G6111 super chain; and a five-chain bar with a new 100-hp bevel gear drive for the bevel bar gear case. A major feature is the new mechanically driven scroll cleanup device, which is driven from a helical gear power takeoff and of the swinging type to provide maximum flexibility and to-the-rib cleanup. The 1CM-2 also has the new Type RDU-2 roof drill, pivotally mounted to the crawler frame, giving greater maximum torque and greater thrust for penetration. The drills work on production cycle without delaying the miner. Also featured was the 34-in-high Joy 3JCM-4 continuous miner, having a cutting range up to 66 in above the floor and an approximate capacity of 3 tpm. The 3JCM-4 also is equipped with the new G6111 super chain, 5-chain bar with the new bevel gear bar drive case, the new taper bearing mounted rotating idler head shaft; and new mechanically driven scroll cleanup device. Bulletin J-403 available from Joy Mfg. Co.



New Loader for Continuous Conveyor Systems

The new Long Model 88 "Pigloader" was specifically designed for use with the Long "Piggyback" conveyors and is suitable for operation with either the PT-12 or PT-15 Piggybacks. The crawler-mounted Model 88 Pigloader is a low-height, heavy-duty machine capable of continuous high-capacity production and is sturdily constructed to withstand the hard usage imposed by the high-tonnage Piggyback mining system, the maker reports. The short length of the unit (16 ft), low over-all height (26 in) and narrow width (5 ft 8 in) are combined to facilitate operation in close quarters and low coal, and the Pigloader also facilitates better roof control and better timbering in breakthrough areas, it is said. The Pigloader has a rated capacity of 4 tpm, average; 6 tpm, maximum. Tramming speed is 120 fpm and the unit weighs 14,000 lb (*Coal Age*, September, 1954, p 120). Bulletin 4006 from The Long Co.

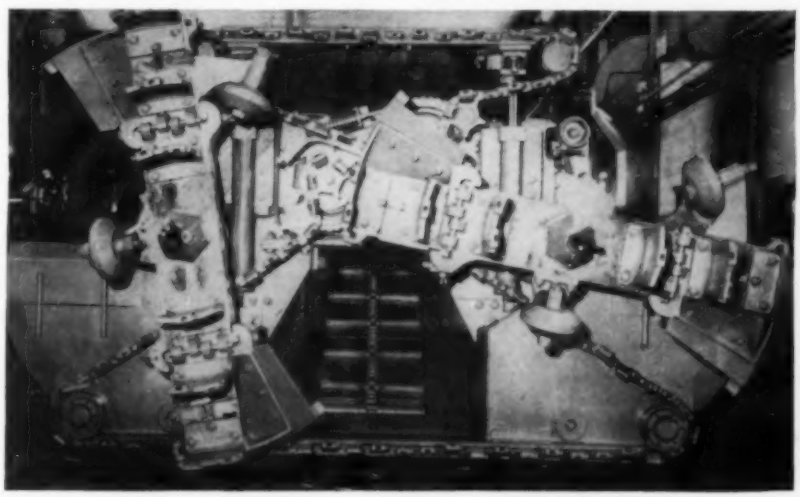


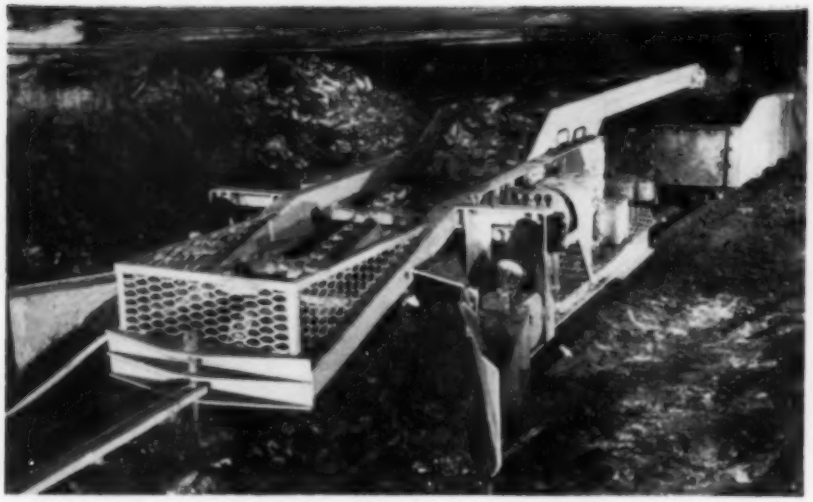
Extensible Belt for Continuous Miners Up to 1,000 Ft.

Shown by Joy Mfg. Co. as the first practical continuous mining system, the "1CM Miner-Extensible Belt Conveyor Combination" includes the new Joy 1CM-2 continuous miner, a bridge conveyor which provides a flexible link between the miner and the belt, and the new Joy extensible belt, a unit comprised of a head section, tail section and intermediate section (*Coal Age*, June, 1954, p 120). The head stays at the main belt discharge point and stores belt, paying out the belting as required. The tail section, connected to the bridge conveyor, advances or retreats with the miner. The intermediate section is made up of easily-assembled Joy "Limberoller" idlers and stands. Both head and tail sections are crawler-mounted for easy tramming. The system permits continuous high-capacity coal production up to 1,000 ft from face to main haulage with changeovers from room to room in less than 2 hr, Joy points out. Bulletin J-303 from Joy.

Boring-Type Machine Features Retractability

The Marietta Miner, now made by Clarkson Mfg. Co., is equipped with improved core breakers and provisions for retracting the cutting arms and lowering the top-cutting chain, thus materially increasing mobility. Major advantages cited for the Marietta Miner are (1) improved roof support because of the circular ribs left by the machine, (2) a size consist closer to that achieved with conventional mining and (3) high capacity in a single unit, thereby contributing to increased concentration. Present units are designed for operations in thicker seams, such as the Illinois No. 6 and the Pittsburgh. Full details available from the manufacturer.





Low-Height Track Cleaner for Thinner Seams

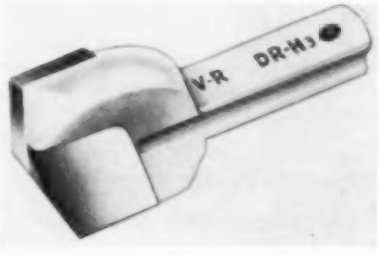
Its new Model 30 Canton track cleaner designed for operation in thinner seams incorporates many of the time-proven principles of the Model 40 as well as various new features of design and construction, according to the American Mine Door Co. Among the new features are: hydraulic control; fluid-drive coupling that uncouples motor if conveyor jams; variable cleaning width; adjustable steel-bushed drive chain; accessibility of motor and reducer; and simplified rail scraper. Bulletin 139. (*Coal Age*, September, 1954, p 122.)

NEW STOPER DRILLS ROOF IN SEAMS AS LOW AS 26 IN

New S-20 "Vac-Nu-Matic" stoper, developed by Cleveland Rock Drill Div., Westinghouse Air Brake Co., may be mounted on a jumbo or used as a conventional stoper for drilling roof-bolt holes in thinner seams. The unit weighs 69 lb complete in the 28-in feed model, and employs a dust-collecting system which draws cuttings down through the drill steel to the chuck, where they are removed without passing through the drill mechanism. The new stoper also features Drift-Nu-Matic feed, consisting of an air piston combined with a chain in such manner that the travel of the machine itself is double that of the feed piston. The Sav-A-Change chuck, also a feature of the new stoper, eliminates the loss of about 4 in of drill steel occurring when conventional chucks are employed. Complete details available from manufacturer.

Versatile Continuous Miner Is Easily Maintained

The Lee Norse Model CM32 continuous miner is said to combine the principle of "pattern cutting" with the best features of modern loading machine designs. "Pattern cutting" is said to have the following advantages: (1) permits use of simplified rotary cutter design; (2) no machine parts subject to major wear except cutter bits; (3) permits deep penetration which results in coarse cuttings; and (4) requires no additional or elaborate power facilities. Weighing 19½ tons, the unit has a rated capacity of 3 tpm, a total of 115 hp and automatic centralized lubrication. Overall length is 28 ft 7⅜ in; width, 8 ft; height, 36 in. The working range of the machine is from 15 in below the coal to 8 ft 2 in above the bottom.

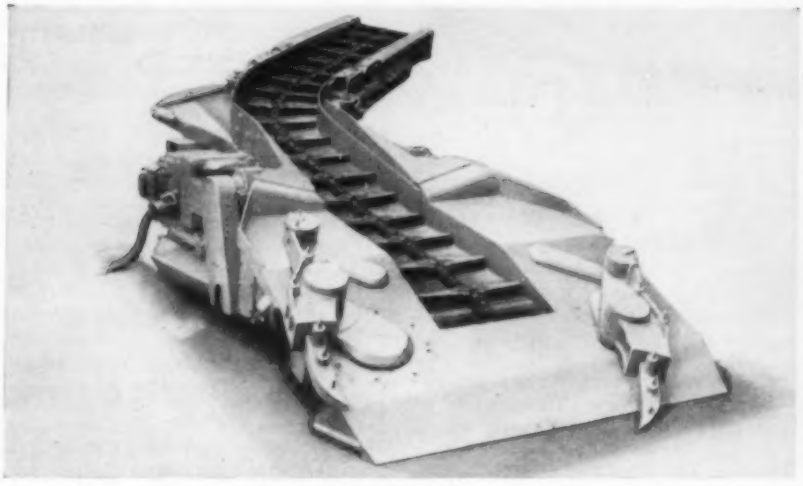


CUTTING BIT DESIGNED FOR DIFFICULT CONDITIONS

A new heavy-duty cutting bit, the CC-5, is made with its top free of all obstructions and with the carbide tip positioned to protect the sides of the bit from wear. A product of the Carboloy Dept., General Electric Co., the new bit features a tip having about 40% more holding power than other tools where the carbide extends across the top because of the added brazing area in the shank in relation to the width of the top. Two styles will be available, one having a hole in the shank to accommodate the pin fastener used on Colmols.

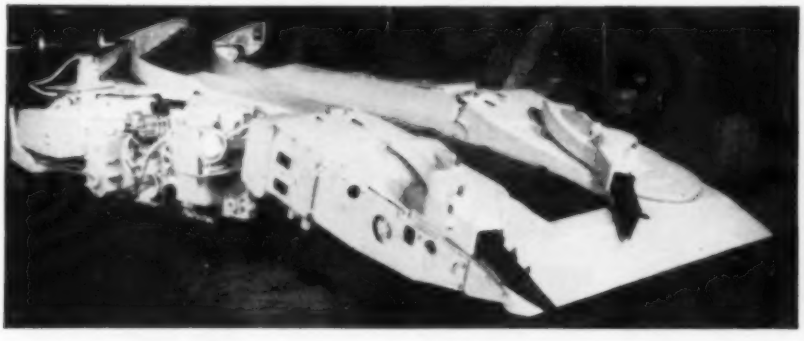
ROOF BIT DRILLS EXTREMELY HARD ROCK

Its new DR-H3 heavy-duty roof-drill bit has proved highly effective in rotary drilling of the hardest rock, reports the Vascoloy-Ramet Corp. Utilizing the heaviest-possible carbides and a design featuring a change in the angle of entry, it requires no increase in drilling speed for efficient results. It is available in four diameters from 1⅜ to 2 in. Included in its full line of tungsten-carbide mining tools, Vascoloy-Ramet also showed a new rotary drill bit for stripping, and a new type of percussion bit for efficient rock drilling.



High-Capacity Crawler Loader Minimizes Cost

The new Jeffrey 81-A crawler loader has a rated capacity of 8 tpm and maximum capacity of 10 tpm and is built in two heights, 32 5/16 and 36 in, for use in low and medium-low coal. Powered by four Jeffrey 15-hp motors and a 4-hp hydraulic pump motor, the 81-A is a fast, easily maneuvered, high-production machine that keeps loading costs to a minimum, the company reports. Among the features for lower maintenance and better service cited by Jeffrey are all steel gearing in gathering drive and elimination of chain drives; interchangeability of head and traction gear parts between left and right sides; interchangeability of gathering and tramming motors; unit construction, with more access for maintenance; and a tramming speed of 137 fpm. Bulletin 891 from Jeffrey Mfg. Co.



Trackless Loader a High Producer in Low Seams

Latest addition to the Goodman line of off-track loading machines is the Type 965 "Tractor-Tread" loader, said by the maker to be particularly suited to loading into low-vein shuttle cars or onto conveyors. With a tramming height of only 27 in, the moderate-cost sturdily built machine offers high rated capacity of 8 tpm for profitable application in both development and full production work and also is highly effective in handling rock or slate, the company reports. Bulletin G-111 with more data available from Goodman Mfg. Co.

HYDRAULIC CHAIN SAW POWERED BY ROOF DRILL

New Joy Type HCS-1 hydraulic chain saw is designed to be used in connection with roof-bolting drills, but it can be attached to any machine with available hydraulic power of 10 to 12 gpm at 1,000 psi. Designed to quickly and easily cut timbers or posts up to 10 in in diameter, the saw weighs 26 lb. It is available with blade lengths of 18 and 23 in, chain speeds of 985 to 1,180 fpm, and motor speeds of 1,500 to 1,800 rpm. Full data from Joy Mfg. Co.

THROWAWAY CUTTER BITS

New Central Mine Equipment "Kerf-Master" expendable "Thro-Away" bits shown by Austin Powder Co. are for all types of holders and lugs and will save up to 25% in bit costs and maintenance, it reports. Bit design assures longer bit life and provides uniform kerf cuttings with a minimum of fines and dust during the entire cutting life of the bit.

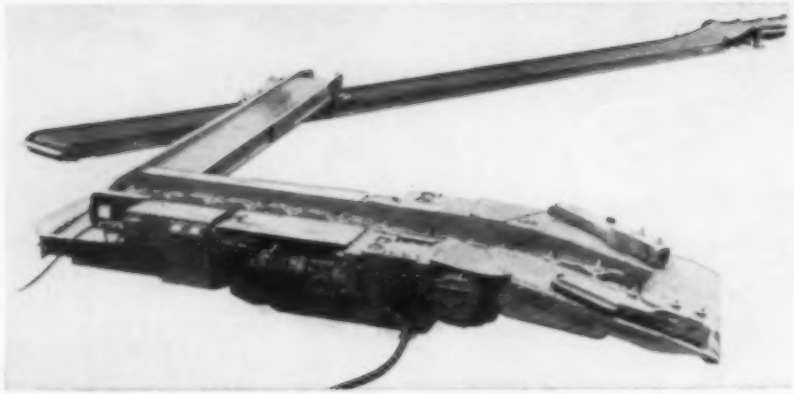
DUST COLLECTOR PROMOTES SAFER DRILLING

MSA bolt-hole cleaner consists of a mechanically operated vacuum pump drawing dust-laden air through collector head at collar of hole, through cyclone and filter drums to precipitate solids. The unit may be mounted on the drill carriage, on a portable compressor or on its own carriage. The collecting drums are easily cleaned merely by tripping dump levers. Bulletin 1504-1 from Mine Safety Appliances Co.

IMPROVED BOLTS FOR MORE STRENGTH AND SAFETY

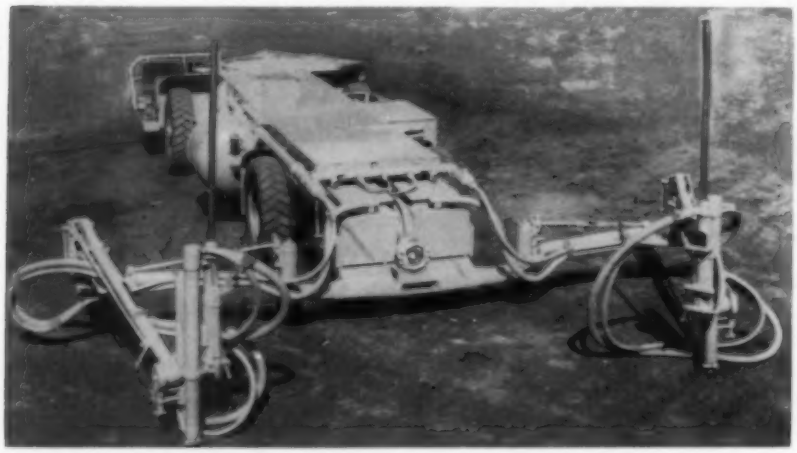
Two new bolt and shell assemblies, shown by the Republic Steel Corp., are said to provide better anchorage and greater strength. The bail-type expansion shell is made up of a forged-steel wedge nut with a rubber washer and a forged-steel rigid shell assembly. It is said to provide a stronger anchor because greater total expansion is possible and more shell surface is in contact with the hole wall.

Republic's forged wedge-head bolt is designed to increase greatly the strength of a bolt assembly. The increase is said to be obtained because the wedge is forged as an integral part of the bolt and therefore there is no danger of the expansion plug cracking under severe stress. Tightening is performed by a nut and the shank of the bolt is never twisted,



Continuous Loading System for Low Coal

An adaptation of the extensible-belt mining system for continuous loading and haulage in low coal shown by Joy Mfg. Co. includes the new Joy 20BU-3 loading machine with bridge conveyor and new extensible room-belt conveyor with skid-mounted head and tail sections. The new 20BU-3 is a high-capacity loading machine designed specifically for bridge-conveyor loading onto room conveyors, which will greatly increase production in low coal. The latest model features complete electrical and hydraulic control with a gathering arm brake to prevent accidental movement of gathering arms when clutch is disengaged. This new machine is also equipped with a quick-detachable power-take-off electrical connector of a new Joy design for the rapid connecting of the bridge conveyor. The loader is 24 in high, and has a capacity of 5 tpm and 50-fpm tramming speed.

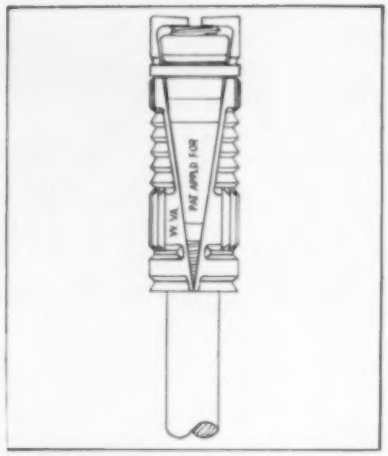


Better Bolting With Compressor-Stoper-Collector

A self-contained roof-bolting machine, including self-propelled two-stage compressor, two stopers on drilling arms, and a built-in dust-collection system featured the exhibit of the Acme Machinery Co., Williamson, W. Va. The new unit, rated permissible by the Bureau of Mines, is offered with or without cable reel and is equipped with power steering, airplane-type disk brakes, hydraulic drive and other features designed to reduce overall bolting costs. The 275-2 compressor couples high efficiency with quiet, smooth operation and rugged dependability, the maker says. The compressor delivers 275 cfm of air at 100 psi. A built-in oil sump and forced-feed lubrication system permits operation on steep grades, it is said.

NEW INTEGRAL AIRLEG FOR WET SINKER DRILLS

New CP integral airleg, mounting a CP 32A drill, receives air through a single hose for both airleg and drill. Air is metered to airleg exactly as required through a pressure-release control valve. Standard feed lengths are 36 and 48 in with 45- and 55-lb sinker drills. Details from Chicago Pneumatic Tool Co.



EXPANSION UNIT FOR SOFT ANCHORAGE

The new "Wedgegrip" roof-bolt expansion unit was designed to provide the greater gripping power needed in oversized holes or in soft anchorage, and offers the maximum expansion that can be secured with a unit entering a 1⅜-in drilled hole on a standard bolt, reports the West Virginia Steel & Mfg. Co. The unit is so designed that the top end is held closely to size, while the bottom end or flanges are caused to flare out and engage the side of the hole by spring action, holding the bolt in position when it is shoved up into the hole and also preventing rotation, thus resulting in immediate initial anchorage. As turning of the bolt continues, the fingers are bent upward and firm anchorage takes place, providing a large expansion that is effective in soft or variable top, it is pointed out.

CARBIDE FINGER BITS EASILY REPLACED

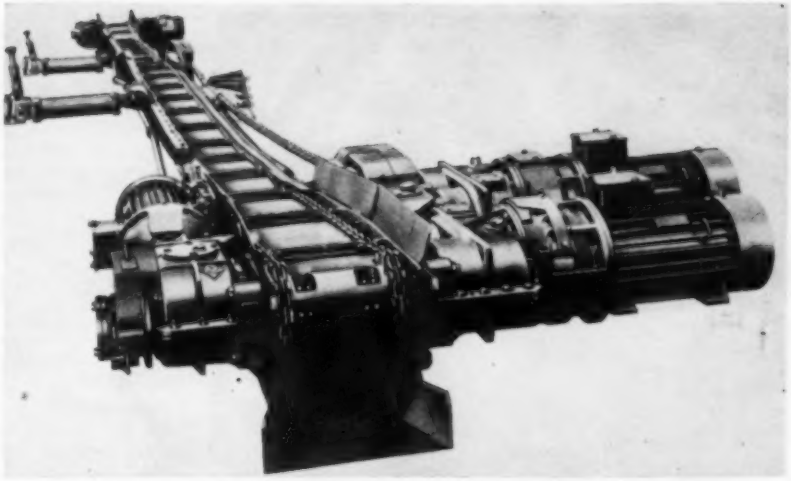
The 16-G bit holder combined with 4-LC carbide finger bits was featured by the McLaughlin Mfg. Co. Lower operating cost and lower bit replacement cost are said to be possible with the new items since worn or damaged individual fingers can be replaced or sharpened as needed. Bits are firmly secured to the holder by a cotter pin extending through each finger and the holder. The 16-G holder is available as a unit or attached to drill augers.

BETTER ROOF DRILLING WITH FLOOR-TO-ROOF FEED

The new Fletcher Model DAF roof-control drill is said to have improved features that permit faster and easier roof-bolting. The new floor-to-roof feed system has the advantage of increased feed, stroke and rigidity plus increased drilling speeds, increased thrust capacity and greater operator protection. Optional equipment listed by the maker as being available with the new unit includes a cable reel, dust collector and hard-rock attachments.

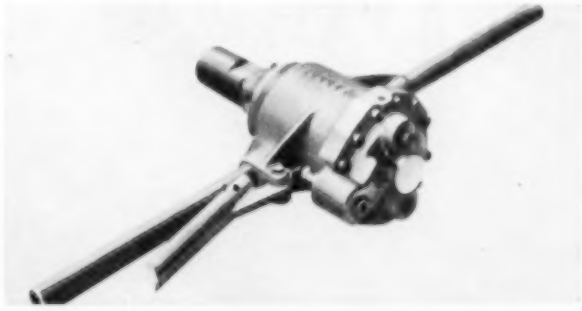
HYDRAULIC COAL DRILL SIMPLE IN DESIGN

New 35-lb CP handheld hydraulic coal drill provides absolute protection from electrical hazards, handles easily and makes a productive one-man unit, according to Chicago Pneumatic Tool Co. The rotor is positioned between replaceable bronze-faced wear plates. Thus, there is no loss of power after extended service. Other benefits claimed for the new unit are perfect response in bad seams and no kick on stalling.



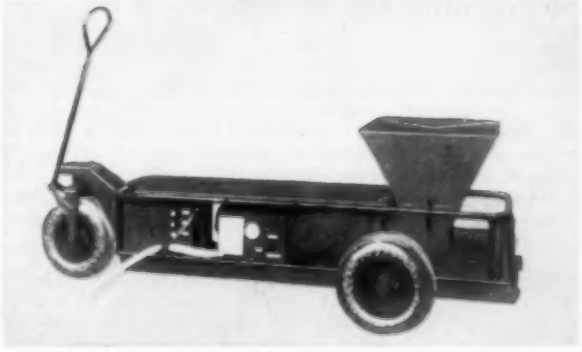
Coal Plow Has Drives for Conveyor and Plow

The Westfalia Conversion equipment, shown by Mining Progress, Inc., differs from the original "German Coal Plow" by utilizing separate drives for conveyor and plow. It may be fitted to any Westfalia Panzer conveyor of Types PFI and PFO. Return or intermediate drives may be fitted at any point in the conveyor, and the plow and conveyor may be operated independently, the company says.



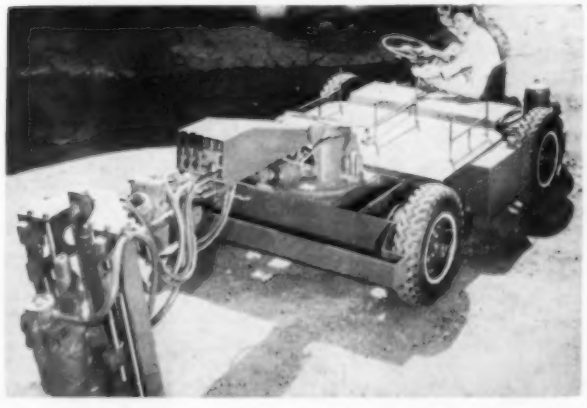
Lightweight Hydraulic Unit for Fast Drilling

Its new Class A9A handheld hydraulic drill weighing only 25 lb makes easy and fast work of drilling, having drilled up to 14 1⅝-in holes 9 ft deep in a 5-min period, reports the Jeffrey Mfg. Co. Hydraulically powered, the A9A needs only two hose connections to the hydraulic circuit of a cutter or other face machine. Attaching the hose at the rear of drill housing on a centerline with handles assures good balance and makes it easy to handle and operate, it is said. Control is by means of a valve lever conveniently located alongside one of the handles. Variable auger speed is obtained by amount of pressure applied to lever, with releasing of pressure on lever stopping the drill instantly. Bulletin 893 from Jeffrey.



New Rockduster Features Versatility

New MSA Bantam 400 rock-dust distributor is only 15 in high with hopper and wheels removed, and is capable of discharging 30 lb per min through 400 ft of 2-in hose. A wet-dust nozzle is available for introducing water into the stream of rock-dust if desired. The unit is low enough to be used on any conveyor belt or in any shuttle car in the lowest seams, or, with a larger hopper, it has sufficient capacity for use in thick seams, the maker says. Plastic-reinforced hose is furnished in 50-ft lengths with non-threaded couplings and insert couplings are provided for repairing broken or punctured hose on the spot. The unit carries USBM Approval. Bulletin 1201-2 available from Mine Safety Appliances Co.



Roof Drill Designed for Faster Bolting

New Dooley Bros. "Rock Eater" mobile roof drill was developed to drill several holes from one position, has working heights of 30 to 80 in and will drill up to 50 in without changing steels. The unit is operated by one man and the drill arm swings 240 deg on an arc of 8-ft radius. Upthrust and withdrawal of drill and positioning of bolt is hydraulically handled, with drill electrically powered. The rubber-tired mobile truck is equipped with clutch and transmission to eliminate costly electrical equipment, and drill and tramming motors are interchangeable to reduce inventories.

Steel Supports Yield Without Deformation

Bethlehem Steel Co.'s yieldable arch meets the demand for roof supports capable of withstanding greater pressure. Under excessive pressures the support yields rather than deforms, thus permitting the surrounding strata to become stabilized. The U-shaped segments of the arch nest together and are held together at the overlap by heavy U-bolt clamps, which also regulate the friction resistance to yielding. Struts are fastened between arches to transmit lateral forces from one arch to another. The support is not difficult to install, requires minimum maintenance and has high recovery value, the company states. Bulletin 903 from Bethlehem Steel.

Drill Arms, Dust Collector Speed Roof Drilling for Bolting

With two of its new pantograph arms and new tank-type dust collector, two men can drill as many holes in 20 min as three men could in 45 min with other methods, reports the Browning Dust Collector Co. The air-operated pantograph arms can be mounted on the Browning utility truck or other portable carrier such as a T-2 truck or shuttle car. Features of the arms include easier maneuvering from one set to another, a lining bar that holds the stoper drill straight, and positioning of the drill on the bottom during drilling to reduce hammering action and vibration. The new tank-type dust collector can be used on Cleveland or Joy stopers, in high or low coal, and is simple in design. The dust tray is quickly changed and the filter is of a new design that permits its being changed in 10 min inside the mine without special tools.

EXPANSION SHELL EFFECTIVE IN VERY SOFT ROOF

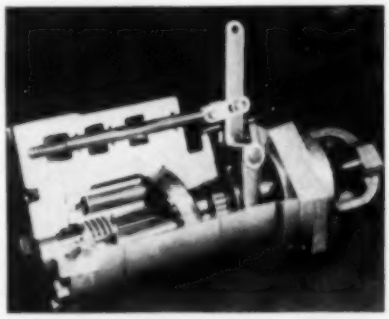
The new lower cost D-2 expansion shell shown by the Pattin Mfg. Co. features a new bail and limit stop that are said to be effective in very soft roof. The disc-type bail covers the threaded hole in the wedge nut and prevents hole cuttings from falling into the nut and fouling the threads. Shell and wedge-nut design provide a stop that prevents the wedge nut from being pulled through the shell regardless of how soft the roof. In addition to being easier to install, the D-2 shell gives the strongest and safest anchorage possible, the maker reports. Available for ⅝- and ¾-in bolts.

FASTER ROCK BITS

New Joy "Copperhead" carbide bits using taper connection eliminates threads and drills faster because of steel-to-bit connection with no intermediate coupling, the maker says. The bit is easily removed for sharpening and may be used with wornout carbide-tipped steels or new steels, working equally well with air leg drills, stopers, or sinkers. Bulletin 87-B from Joy Mfg. Co.

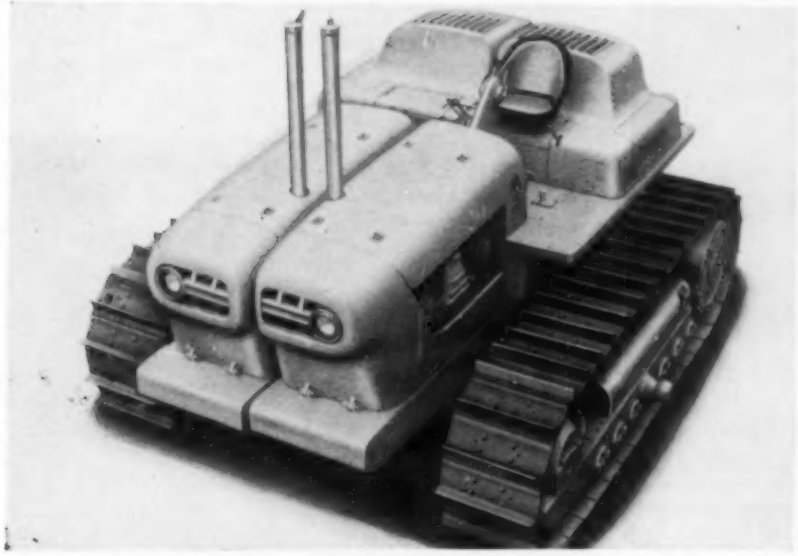
New 7-Yd Dragline for Faster Stripping

The new Page Model 721 single-deck 7-cu yd walking dragline is a fast, economical unit particularly suited to coal stripping, reports the Page Engineering Co. With a 7-yd bucket, boom length is 125 ft; maximum allowable load, 36,500 lb; and hoist-line speed, 213 fpm. Boom lengths of 135 and 145 ft also are available with corresponding decrease in bucket size. The machine is powered by the recently developed 480-hp Page V-6 horizontal diesel engine featuring greater simplicity of design and construction for dependable power and easier servicing. The bucket is built to individual requirements and utilizes the Page "Automatic Dragline Bucket" design for faster digging and easier handling. Bulletin WDSD155 from Page.



HYDRAULIC CRANKING MOTOR FOR FAST ENGINE STARTING

New "Hydrotor" hydraulic cranking motor available in three sizes to fit various types of gasoline and diesel engines is smaller and lighter than electric or pneumatic starters but more powerful and provides a quick, dependable starting medium even in sub-zero temperatures, according to Hydramotive, Inc. The unit operates in a closed hydraulic system completely independent of batteries and requires no regular maintenance checks. A recharging pump provides for automatic cranking of the system, with a hand pump available to restore cranking energy in an emergency. The higher cranking speeds and faster starting results in faster build-up of lubricating oil pressure to vital engine parts and thus reduces tendency to scuff and wear, the company points out. Bulletin with full data from Hydramotive, Inc.



Twin-Engine Bulldozer, New 7-yd Scraper

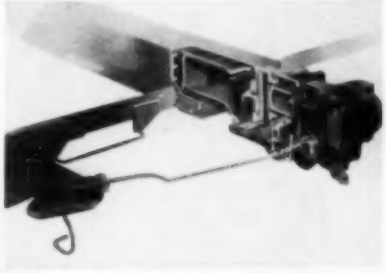
Euclid tractor, Model TC-12, has twin engines and twin power trains, thus taking advantage of the high-volume, lower-cost assemblies used in smaller machines to achieve the operating benefits of higher capacity in a single machine. Power is provided by two 190-hp diesel engines, each operating through an Allison Torqmatic drive. The new scraper, Model S-7, is an overhung-engine unit on rubber tires having a struck capacity of 7 cu yd. Power is provided by a 138-hp diesel engine, non-stop turns can be made in 26 ft and the transmission permits five forward speeds. More complete descriptions of the TC-12 and the S-7 appear in *Coal Age*, November, 1954, p 112.

Versatile Truck-Mounted Unit Cuts Drilling Costs

New M-8A heavy-duty rotary drill, shown by Davey Compressor Co., is rated to drill 300 ft of 6¼-in hole using air, or 1,000 ft using mud. The unit pulls 15-ft drill sections, and is recommended for well drilling, core drilling, structure testing and blasthole drilling (*Coal Age*, February, 1955, p 106).

NEW ELECTRONIC CONTROLS FOR ELECTRIC SHOVELS

Electronic controls as standard equipment on P&H electric shovels are offered by Harnischfeger Corp. The new controls govern all shovel actions in contributing to better co-ordination of shovel motions by the operator and reduced cycle time (*Coal Age*, March, 1955, p 108).



CAR COUPLERS DESIGNED FOR STRIP-MINE SERVICE

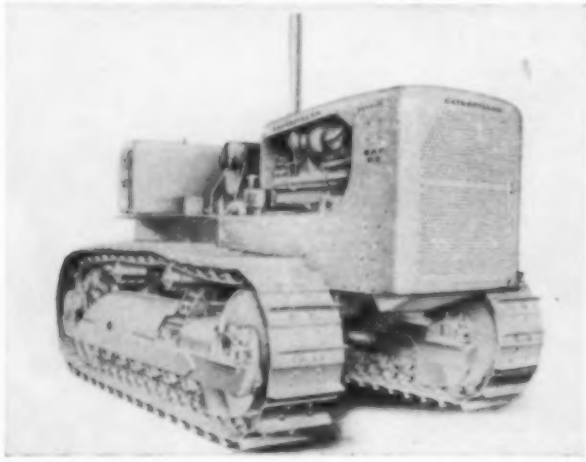
New Type F interlocking coupler, product of National Malleable & Steel Castings Co., especially designed for large cars used in open-pit mines, features heat-treated and hardened steel plates at critical wear points to compensate for the severe track conditions and abrasive service in this type of mining. The unit is equipped with National's multipad rubber cushioning device.

Coal Recovery Auger Works in Narrow Space

A new Model 28 Compton coal auger designed to work in pits or on benches as narrow as 30 ft was shown by Compton, Inc. Capable of producing up to 50 tons of coal per hour, the unit is only 28 ft long and can drill 28- to 44-in hole up to 150 ft deep. Power is supplied by a 175-hp diesel engine. Other features cited by the manufacturer include easily accessible auger sections racked on the frame; elevating conveyor integral with the machine; hydraulic jack legs that lift the frame 54 in.

Varied Features for 23-Yd Scraper

The new Model B Tournapull is the first new machine completely designed and built by the new LeTourneau-Westinghouse Co. The single-engine self-propelled scraper has a struck capacity of 18 yd and a heaped capacity of 23 yd with sideboards. Powered by a 293-hp diesel, the Model B offers 10 gear ratios, ranging from 2.4 to 28.4 mph. Other features cited for the new Model B include easy loading characteristics of its new scraper design; deflector plate; high apron lift; wheels inside the cutting edge of the scraper blade; power steering; full-shift fuel supply; engineering stressing easy operation and accessibility of components; and high maneuverability (*Coal Age*, March, 1955, p 106).



New 230-Hp Tractor Provides 30-Ton Drawbar Pull

The new 56,000-lb D9 Caterpillar tractor has 230 drawbar horsepower and is powered by a new 6¼x8 6-cylinder "Cat" diesel engine with turbocharger, delivering 286 hp at 1,200 rpm for both the torque-converter and direct-drive models. The torque converter provides speeds up to 7.8 mph—three forward, two reverse. The direct-drive unit has six speeds forward and reverse—1.6 to 6.8 mph. Operator convenience, comfort and safety were given special attention in design (*Coal Age*, May, 1955, p 128).

New Blasting Agents Economical and Versatile

The du Pont Co. offers two new blasting agents that feature economy, versatility, convenience and no headaches in handling. "Akremite" (*Coal Age*, May, 1955, p 70) is licensed exclusively to the du Pont Co. under the Maumee Collieries Co. Process Patent No. 2,703,528. The du Pont Co. will furnish the finished product or license the consumer to make his own. The new blasting agent can be manufactured and used by consumers under a sublicense or purchased for use from a sublicensed explosive manufacturer. "Nitramite" is the latest addition to the du Pont "Nitramon" and "Nitramex" group of blasting agents. It is put up in a substantial container and can be loaded in water, provided it is shot within 8 hr, the maker says.

New 200-Hp Tractor Has Torque Converter

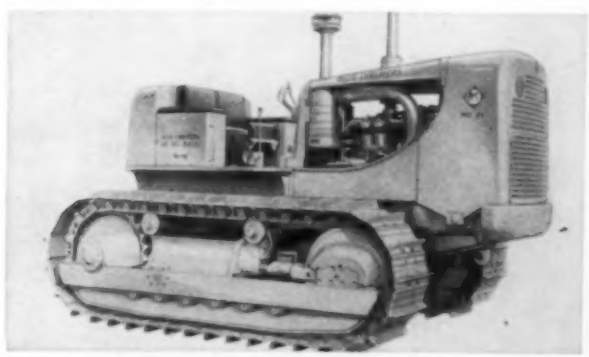
The new Torque Converter International TD24 develops 59,500 lb maximum drawbar pull at the workable tractor speed of 0.8 mph. Multiplying torque up to five times, International's hydraulic torque converter is mounted as an enclosed unit, with clutch on the engine. It drives through a heavy-duty universal joint to the transmission, mounted as a unit in the rear of the frame. The unit has two forward and two reverse transmission speeds, ranging up to 6.9 mph. With each gear speed, there is a high-low speed range, giving instantaneous speed selection at finger tip and eliminating the need for shifting most of the time, reports the International Harvester Co.

Self-Propelled Drill Is Mobile and Versatile

The "Rotadrill" self-contained, self-propelled and self-powered rotary drill was featured by Schramm, Inc. Mounted on a Pneumatractor, the unit can drill holes up to 4¼ in and to a depth of 500 ft. Drilling pressure is about 10,000 lb and down feed is by hydraulic cylinder and double-width chain with bronze bearing sprockets. The prime mover is a Schramm Heavy Model 125-cfm Pneumatractor with five forward and one reverse speeds. Hydraulic valves mounted in a bank are conveniently located for one-man operation. The unit may be equipped with such extra equipment as dust collectors, suction fan and chip-collector box. Bulletin PR-55 from Schramm, Inc.

High-Capacity Scraper Handles Big Jobs

The new International 75 Payscraper is the largest high-speed, rubber-tired earthmover in the International line and is designed to handle big earthmoving jobs. The Paymaster has a 262-hp diesel engine that permits the unit to handle an 18-cu yd load at speeds over 24 mph. The tractor has five forward transmission speeds and one reverse, ranging from 2.77 to 24.75 mph. Other features cited for the new model by the International Harvester Co. include strengthened power train; increased radiator capacity; improved air system; improved Hydro-Steer; easy-to-operate, positive-action controls; and more operator comfort.



New Tractor Offers More Power, New Features

New Allis-Chalmers HD-21 develops 204 hp at flywheel, features a new high-capacity cooling system, a new master clutch, new engine and transmission and new heavier, heat-treated track. Weighing 44,000 lb, the new machine is reportedly one of the biggest and most powerful crawler tractors ever put into production. More complete description in *Coal Age*, March, 1955, p 106.

15-Yd Scraper Shows Improved Performance

New Allis-Chalmers TS-360 motor scraper, with capacity of 15 yd, struck, and 20 yd, heaped, is equipped with a new 280-hp A-C diesel engine to insure top performance in earth moving, the maker says. The new tractor frame, based upon the "unit construction" feature of other A-C units, permits easiest servicing and maintenance. Other features are "Double Safety" air brakes, rapid cable-control response and a new electric starting system. See *Coal Age*, March, 1955, p 108.

New Tractor Loaders, Shovel Introduced

A new line of tractor shovels, ranging from ½ cu yd to 2¼ cu yd in capacity and a truck-mounted ¾-yd shovel, all placed on the market within the past year and appearing at an American Mining Congress Coal Show for the first time were shown by Construction Machinery Div., Clark Equipment Co. Advantages claimed for the "Michigan Tractor-Shovels" include heavier weight and more horsepower than comparable units, steering boosters, easy accessibility to all major parts and no foot clutch. Specifications from manufacturer upon request. The shovel handles a boom 19 ft in length and dipper stick 14½ ft long, both of seamless tubular construction. The unit is available on crawlers.

Gravity-Dump Hauler Completely Redesigned

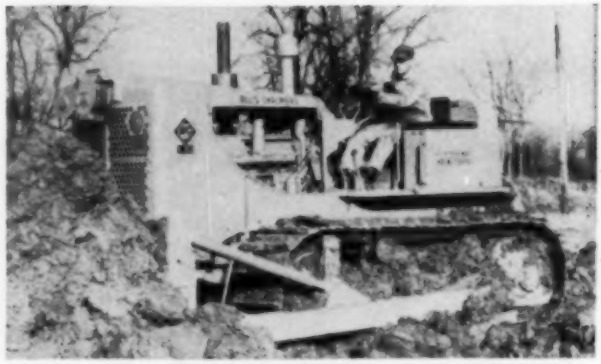
"Dumptor," Koehring Co.'s shuttle-type off-highway haulage unit, is a redesigned unit now featuring a smoother body for faster dumping through the elimination of wheel recesses, a restyled operator's cab for easier manipulation of controls, new dump latch for reduced maintenance, improved spring system and wider steering axle to permit steering wheels to track heavier drive wheels.

More Efficient Tractor Easier to Operate

Two new D8 models include engineering advancements that make them more powerful, faster, easier to operate and easier to service, reports the Caterpillar Tractor Co. Power is provided by a new diesel engine delivering 191 hp at 1,200 rpm for both the torque-converter and direct-drive models. The torque-converter, 5:1 multiplication, has speeds up to 7.4 mph through a constant-mesh transmission which has three speeds forward and three reverse. The direct-drive unit has five forward speeds and three reverse, 1.5 to 5.2 mph with the standard transmission but optional transmissions offer speeds as

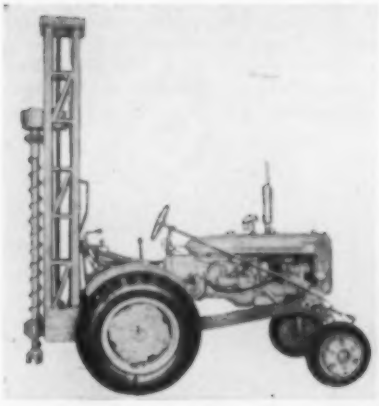
low as 1.4 mph to as high as 7.2. Among the new features adding to the operating efficiency and serviceability are: (1) new fuel injection system; (2) flanged-center main bearing; (3) timing gear integral with crankshaft; (4) nearly all oil lines and valve-push rods located within the engine; (5) larger-capacity oil manifold; and (6) new water pump and larger cylinder-block water passages.

COMPLETE LIST OF COAL SHOW EXHIBITORS BEGINS ON P 110



Tractor Offers 60,000-Lb Drawbar Pull

The new 31,500-lb HD-16, second new Allis-Chalmers tractor developed this year, is available with standard transmission or torque-converter drive. Drawbar pull of 60,000 lb is obtained with the torque converter and a new A-C 6-cylinder, 150-hp diesel engine. The new tractor also features a wrap-around radiator guard which tips down for maintenance work, long-life ceramic master clutch lining, the new "Tru-Dimension" track and matched equipment (*Coal Age*, May, 1955, p 130).

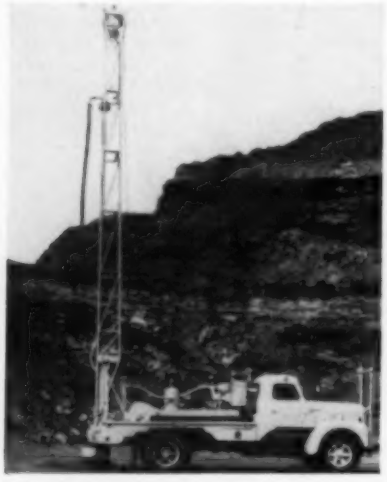


VERTICAL DRILL ON TRACTOR

A new Cardox-Hardsocg tractor-mounted vertical drill is designed for maximum mobility and controlled costs where many vertical holes are to be drilled. Set up for one-man operation, the rotation of the auger is achieved through a power take-off from the tractor, and the auger is raised, lowered and fed into the work by a built-in hydraulic cylinder. More data available from Cardox Corp.

BLASTING MACHINE SERVES UP TO 50 CAPS IN SERIES

"Titan Blaster," by Hercules Powder Co., is a condenser-discharge-type unit which must be charged to full voltage before it will operate. Maximum capacity is 50 E. B. caps in series, 1,200 caps series-in-parallel (30 series of 40 caps each) or 60 caps in parallel. Also shown by Hercules was a V. A. O. blasting meter, comprising a voltmeter, ammeter and galvanometer in a single unit for checking circuits and detecting stray currents. Literature available from the company.

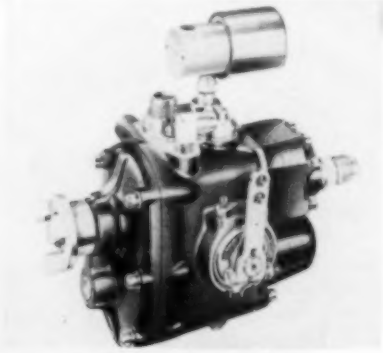


MOBILE DRILL FOR FAST BLASTHOLE DRILLING

The Failing Model CBH Holemaster is a sturdy, compactly built, highly mobile drill combining a hydraulic chain feed with use of compressed air for removing cuttings, the maker reports. Completely self-contained and requiring no auxiliary equipment, the drill is simple in design, with the few controls conveniently grouped for fast, safe operation, and produces clean, straight, uniform holes, it is said. Bulletin 5401F13 from the George Failing Co. (*Coal Age*, April, 1954, p 126).

LONGER POWDER CARTRIDGES

New "King-Size" dynamite cartridges are available in lengths of 24, 20, 16 and 12 in, and in diameters of 1¼, 1½, 1¾ and 2 in, from the Explosives Dept., Hercules Powder Co. The cartridges make possible more uniform fragmentation in the deeper blastholes now being used, and also effect substantial savings in time and labor in loading blastholes (*Coal Age*, March, 1955, p 110).

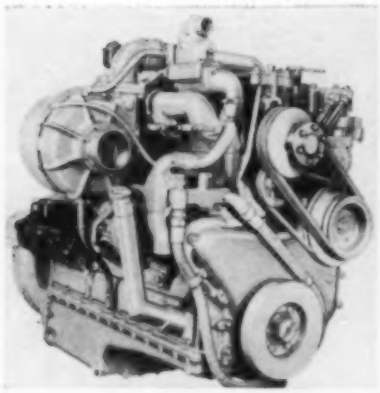


NEW SYSTEM SIMPLIFIES DIESEL-FUEL INJECTION

A greatly simplified diesel-fuel injection system, the PT system developed by Cummins Engine Co., eliminates fuel-rack adjustments, high- and low-pressure valves and other parts associated with high-pressure systems. An average mechanic can be trained within a matter of hours to fully understand its operation, and the unit can be applied to all Cummins engines built since 1932. It weighs only 13 lb. More details in *Coal Age*, October, 1954, p 124. A later development of the PT system, announced at the American Mining Congress Coal Show, is a mechanical output-shaft governor for operation with torque converters, which eliminates the need for expensive hydraulic governors. Bulletin 5392 available.

HAND-WOUND CONDENSER BLASTING MACHINE

Atlas Powder Co.'s "Shotmaster" condenser-discharge blasting machine with hand-wound generator offers maximum capacity in a blasting machine for jobs requiring more power than that in a rack-bar-type machine. A big benefit, the maker says, is that the wind-up feature eliminates need for fresh batteries.



NEW TURBODIESEL ENGINE FOR COAL HAULERS

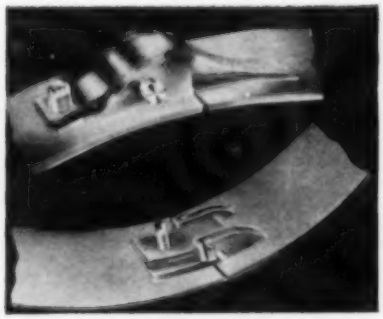
Shown above is the new 335-hp Cummins Turbodiesel engine, Model NRT-6, one of a new line developed by Cummins Engine Co. especially to meet the requirements of the coal industry for higher horsepower ratings in trucks, coal haulers, tractors, shovels and other equipment, the maker reports.

PORTABLE LOGGING UNIT IS VERSATILE AND ACCURATE

A portable electric logging unit for borehole surveys, shown by the George E. Failing Co., features versatility, accuracy, and easy and economical servicing. The 102-lb. "Logmaster" unit fits into an 18x17x19½-in anodized aluminum case with moisture- and dust-tight seals. Use of unitized construction enables nontechnical personnel by simple procedures to isolate electrical faults, the maker says. Bulletin 5504F60.

BRAKE AND CLUTCH LIFE RAISED ON EARTHMOVERS

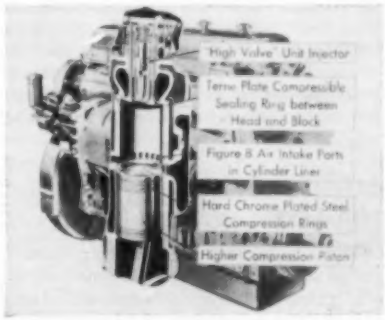
Brake Engineering Co.'s "Automatic-Arc-Compensator" assemblies are said to convert standard-type brake and clutch friction bands into secondary actuating mechanisms, providing maximum engagement of lining materials with drum surfaces regardless of lining wear or drum distortion and also providing a multiplication of the present actuating pressures. Available in both external and internal types for a wide range of trucks, tractors, shovels and other earthmoving equipment, the units are said to provide more



positive control, reduced mechanical maintenance, lower operator fatigue, and longer life from lining materials.

REPLACEABLE-BLADE BITS FEATURE CARBIDE EDGES

"Blue Demon" bits, offered by Herb J. Hawthorne, Inc., are replaceable insert bits now featuring tungsten-carbide cutting edges. Type DB insert blades are available for making bit assemblies in sizes from 3 in to 4½ in, O. D., and Type AC for 4¼ to 6¾ in. Other types extend the range of sizes from 7⅞ in to 11 in. The auger bit above includes a steel ball which acts as a valve to release air or water to lubricate cuttings and prevent back-up in drill stem. Catalogs 555 and 526 available, including instructions in bit use.

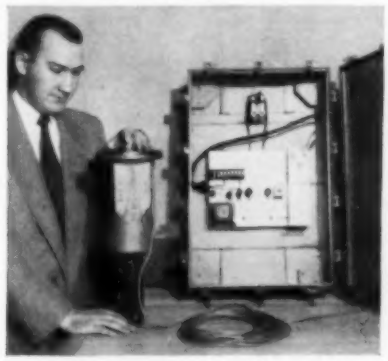

"High Valve" Unit Injector
Terne Plate Compressible Sealing Ring between Head and Block
Figure 8 Air Intake Ports in Cylinder Liner
Hard Chrome Plated Steel Compression Rings
Higher Compression Piston

HIGHER FUEL ECONOMY IN IMPROVED DIESEL ENGINES

General Motors Series 71 diesel engines provide better fuel economy, increased horsepower in some sizes and longer life, the maker says. Latest improvements in the line include a new cylinder liner; new piston, piston rings and retainers; new cam followers and other changes, which promote freer flow of air into the cylinders and increased compression, thus more power. The new parts are interchangeable with those in older engines (*Coal Age*, November, 1954, p 116).

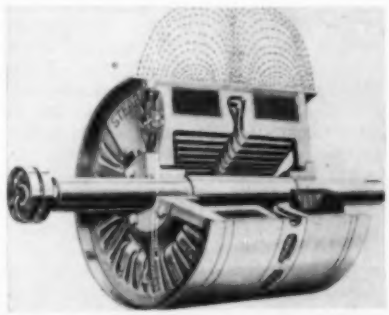
AKREMITE PRIMER

The Austin Powder Co. offers its AL-4 primer or booster for shooting "Akremite" explosives (*Coal Age*, May, 1955, p 70). Featuring high strength and speed, the AL-4 is packed in waterproof polyethylene tubing in various sizes and weights.



BIN-LEVEL INDICATOR USES RADIO SIGNAL

"Robintronic" level indicator, an electronic device developed by Hewitt-Robins, Inc., uses a radio signal to indicate the level of stored material in preventing accidental overfilling of bins, tanks, silos and other storage units. Offered for use in coal and other industries, the Robintronic consists of a small radio transmitter housed in a steel probe which is placed at the level where the flow of material is to be controlled. Bulletin D-137 from Hewitt-Robins (*Coal Age*, April, 1954, p 126).



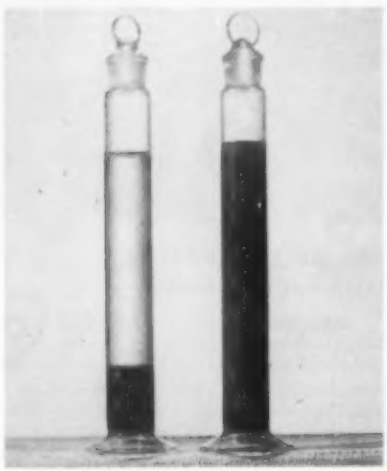
MORE POWER IN NEW TWO-COIL MAGNETIC SEPARATOR

A new electro-magnetic pulley (above), produced by Stearns Magnetic, Inc., features two-coil rather than the conventional three-coil construction to provide a more powerful magnetic field. The new Type WPD Model M permanent magnetic drum separator is designed to provide efficient magnetic recovery of magnetic media as used in heavy-density plants. Features listed by Stearns in-

clude: (1) non-magnetic stainless-steel separation tank; (2) feed-distribution chamber an integral part of separation tank; (3) controlled introduction of slurry to magnetic pickup zone; (4) waterproof drum and cylinder; (5) low horsepower requirements; (6) nonmagnetic drive components; (7) powerful permanent magnet assembly; (8) high-gravity magnetic concentrate discharge; (9) separator operable without wash sprays if desired; (10) simplicity of operation; and (11) easy disassembly.

NEW FEED DISTRIBUTOR FOR CONCENTRATING TABLES

The new Concenco Model 208 feed distributor requires 3 ft less headroom than the conventional Model 108. The new unit also features heavier construction and splashproof design. Full details from Deister Concentrator Co.

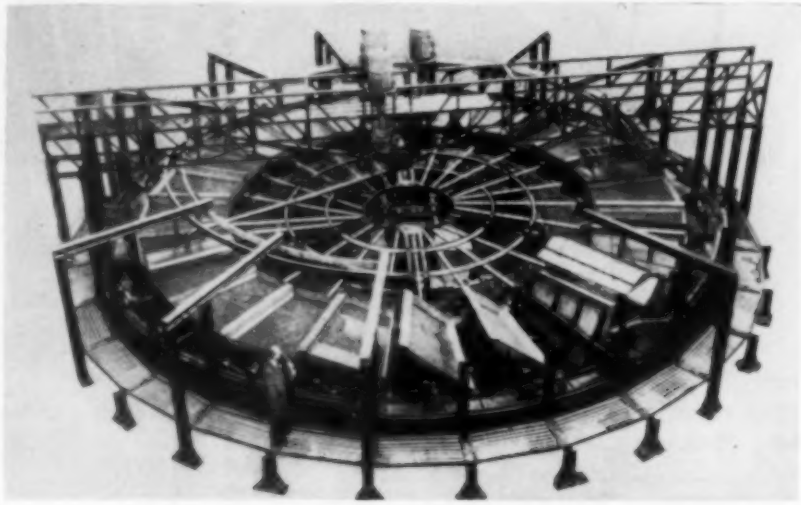


FLOCCULATING AGENT SPEEDS SETTLING RATE

"Separan 2610," a new flocculant from Dow Chemical Co., is said to permit reductions in filter area in the order of 88%, reductions in cake moisture up to 5% and up to 30-fold reduction in amount of flocculant required. Above photo indicates performance of new flocculant, the one at the left being treated with Separan 2610. Fuller description in *Coal Age*, January, 1955, p 102.

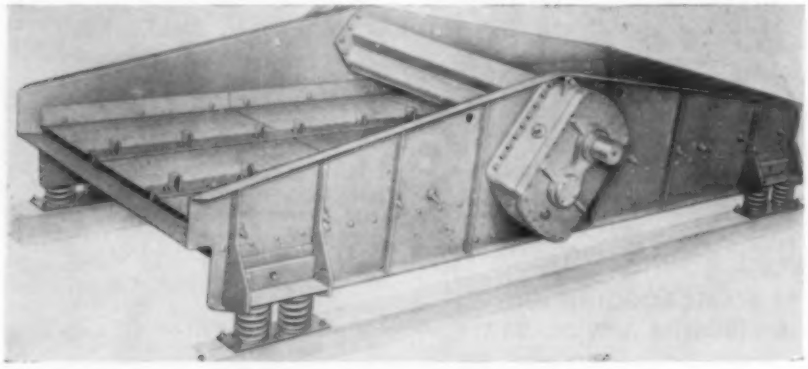
FLUIDIZED-BED DRIER HANDLES FINE MATERIALS

Heyl & Patterson unveiled at the American Mining Congress Coal Show a new fluidized-bed drier having a capacity of 2 tph per sq ft of hearth area when fed with ¾ or ½x0 coal. Outstanding features of the new development are (1) discharge temperature of the coal can be closely controlled, (2) there are no moving internal parts and (3) the unit can handle fines, such as, filter cake, according to the manufacturer. The only moving parts are the fan which moves the hot gases and the star feeders in the inlet chute. Any conventional type of dust-collecting equipment may be employed.



Filter Combines Efficient Washing, High Efficiency and Low-Operating Cost

The Bird-Prayon Filter is a continuous, rotary horizontal vacuum filter said to combine super-efficient multistage washing, high operating efficiency and low operating cost. Available in sizes providing filter areas from as small as 27 sq ft to as large as 516 sq ft, the unit can handle high tonnages at a substantial reduction in first cost, operating cost and maintenance cost. Bulletin BP with details available from Bird Machine Co.



Vibrator Has Low Profile, High Capacity

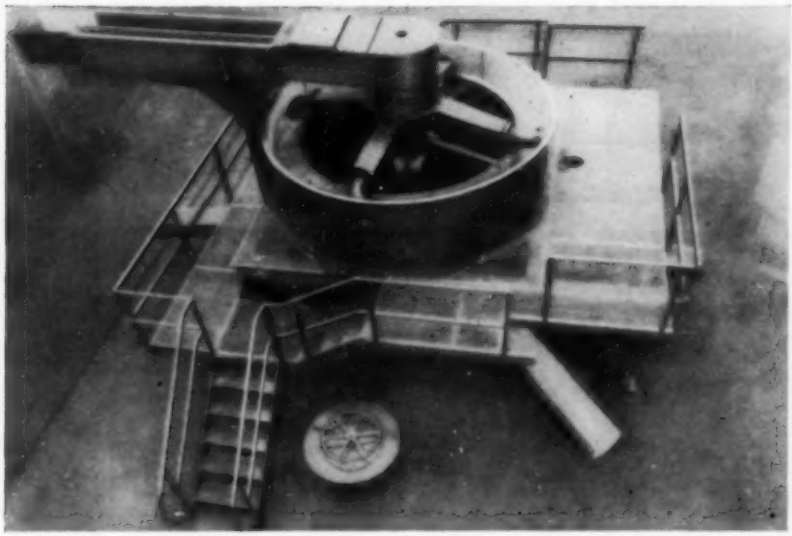
Link Belt's new "Straightline" vibrating screen incorporates the benefits of horizontal screening with minimum height and greatly simplified maintenance. The horizontal unit has two vibrators, one mounted on each side of the screen, for easy access and servicing. The vibrators do not project above sideplates; therefore, headroom is held to a minimum. "Straightline" screens are available in sizes from 4x8-ft to 6x20-ft with either one or two decks and are especially suited for sizing and dewatering large quantities where headroom is limited. Bulletin 2562 from Link-Belt Co.

DENSITY CONTROL FOR BETTER WASHING

New fully automatic density control for Chance cones and dense-media vessels developed by Fairmont Machinery Co. provides constant maintenance of desired specific gravity from setting on panel board. As a result, washing can usually be done at a higher specific gravity than with fluctuations, better recovery is obtained and sand is saved since the cone is not overloaded, the company points out. Full details from the company.

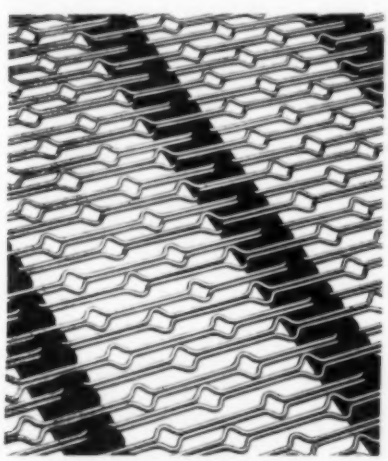
MAGNETITES FOR WIDE RANGE OF WASHING SYSTEMS

With the addition of its new "Super fine" grind, Orefraction, Inc., now offers four grinds of its high-grade magnetite for heavy-media washing of all mesh sizes in all types of systems with a wide range of specific gravities. Because of the high percentage of magnetics (94%), their high specific gravity (4.8%) and a low moisture content of less than 0.5%, Orefraction magnetite offers greater operating economies and higher efficiencies, the company reports.



Preliminary Dewatering With Driveless Screen

A Hein-Lehmann radial screening plant, a German unit soon to be produced and distributed in the U. S. exclusively by The Nolan Co., Bowerston, Ohio, is said to offer marked advantages in initial cost, maintenance, weight and floor-space requirements in filling the need for effective thickening ahead of final dewatering. The only moving part in the radial screen is propelled by the entering pulp, hence no driving agency is required. Fine coal from jigs or tables flows through an admission flume into a rotary cross distributor which allocates equal amounts of constant grain composition to each partition of the radial screen. Pulp is collected and stowed in the centrum by means of lateral stowing plates, thus checking the flow of the following pulp and forcing the water to run off through the screen. Appearance of the radial screening plant at the American Mining Congress Coal Show was the first showing of the unit in the U. S.



NEW PRINCIPLE FOR SINGLE-DECK SCREENING

"Duo-Screen," announced at the American Mining Congress Coal Show by Barber-Greene Co., automatically provides dual motion in a single-deck vibrating screen through the interlacing of two decks which move relative to each other as a result of the screening unit's motion. A German development, soon to be produced and distributed in this country exclusively by Barber-Greene, Duo-Screen, the company states, takes the place of heated screen, prevents blinding when handling wet materials, and increases screen capacity up to 50%, dry.

SCREENING HOLDS SLIVERS

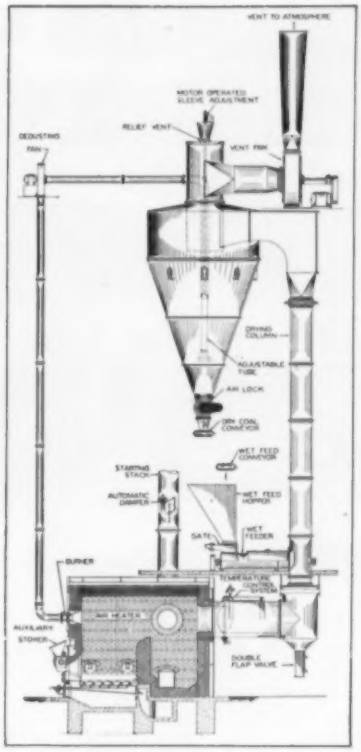
Wedge Wire Corp.'s new Marcel-type screen was designed for use where slivers passing through are objectionable in the end product and is available in all sizes and shapes. According to the company, it also offers the features of other Wedge Wire products—long life, non-blinding operation, dewatering efficiency and a flat surface to clean the openings.

NEW SCREEN LASTS LONGER

Bixby Zimmer's new "Grizzly Rod" screen is designed for maximum performance in sizing raw or clean coal. Wearing bars may be included when the screen is handling heavy, chunky material.

HORIZONTAL VIBRATOR IS EASILY MAINTAINED

The "LeccoVib" horizontal vibrating screen, product of the Lecco Mfg. & Engineering Co., is particularly suited for installation in low head room, and may be provided with base mounting or cable suspension without the loss of the dampened start and stop control. Close control of the angle of flow of material is possible through simple adjustments. One man can handle any part of the drive assembly, with the exception of the eccentric shafts, and the individual parts are designed for easy replacement.

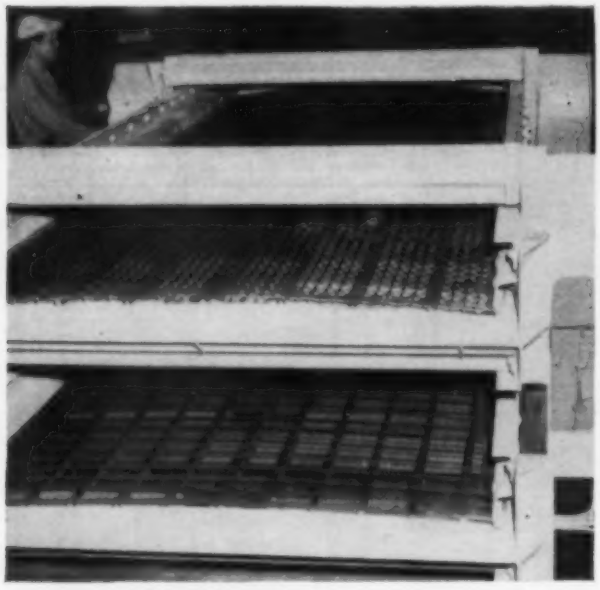


DEDUSTING SYSTEM SALVAGES COAL

Combustion Engineering's new C-E dedusting system provides a simple and efficient answer to the problems of vent losses to the atmosphere and clouds of dust at railroad-car loading points, the maker says. The new system removes as large a fraction of the ultra-fines as practical and delivers them to the furnace to supply heat for drying coal. An adjustable tube, which can be raised or lowered from the panelboard by the operator, and a dedusting fan are combined to remove the ultra-fines and return them to the furnace. Therefore the regular stoker need not be used for firing the boiler and is only for starting or emergency purposes. The dedusting system may be installed in either existing Raymond flash driers or in new units, the maker says.

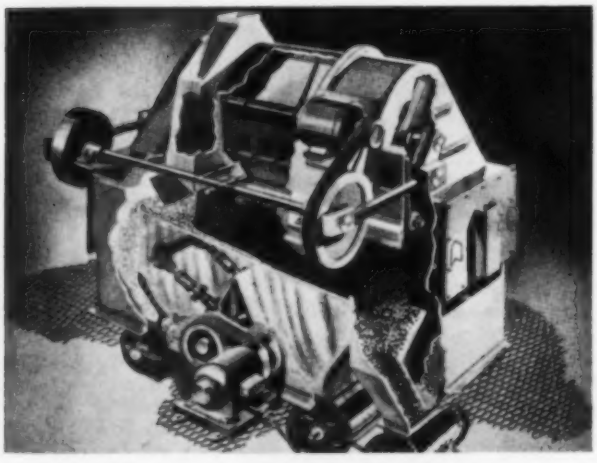
SPRAY OIL PENETRATES COAL FOR BETTER COVERAGE

Keenan 7 "Magic Film" coal-spray oil provides better freezeproofing and dustproofing of coal with savings of up to 50% in oil costs because of its better water-repellent, penetrating and sealing qualities, the Keenan Oil Co. reports. A highly refined, odorless oil delivered by tank car or truck, Keenan 7 rapidly and permanently dewaters the coal, forming a coating that prevents additional moisture pick-up, improving coal appearance and maintaining Btu content, it is said. Among the several special-purpose additives available is a new coloring additive that increases market value by providing uniform appearance of the coal, and that will not rub off because of its thorough penetration into the coal.



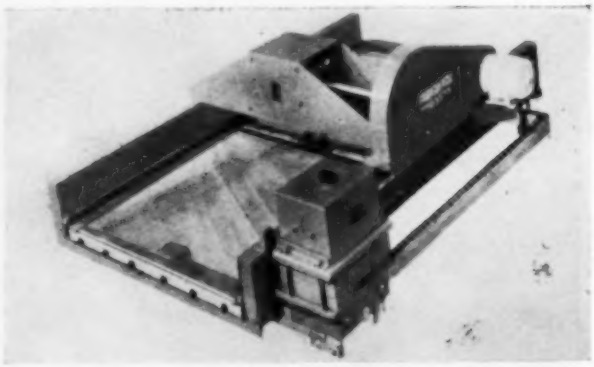
Versatile Vibrating Screen Uses Less Power

Hewitt-Robins' new "hi-G" vibrating screen utilizes the principle of "modified resonance," said to produce a controlled, sharp vibrating action, making it possible to build large screens that require only small accessible exciters and need only one-fourth to one-half as much power as would be considered normal. The unit includes a modified resonant spring system that permits the screen to supply most of its own energy, and is self-amplifying, self-damping and self-governing. To this was added the "G-Factor" in a rhythmic, accelerating beat to give the extra kick needed for best anti blinding, anti plugging action, the maker says. Almost all the power required to operate the reaction spring system comes from the springs and therefore the small motor needs supply only enough additional energy to replace friction losses. Weight of the live frame, spring system, vibrator and live load are all carried by the soft supporting springs. No heavy foundations or unusual structural bracing are needed, it is said. Bulletin 160 from Hewitt-Robins.



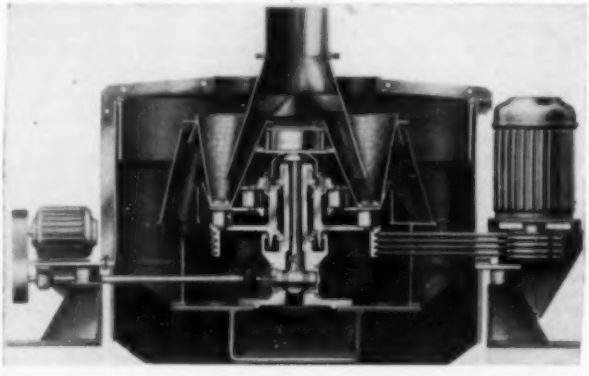
Dry-Cleaning Unit for Fine Coal

The McNally-Brusset vacuum jig, a fine-coal (½x0) dry cleaning unit, was featured at the Coal Show by McNally Pittsburg Mfg. Corp. After extensive field and laboratory tests, the cleaner now is offered to provide greatest capacity per dollar of investment and minimum maintenance cost, the maker says. The Brusset is a self-contained unit, similar in action to a wet jig. There is no need for ducts, fans or dust collectors, since dust is confined within the machine and collected with the products. Bulletin 542 available from the manufacturer.



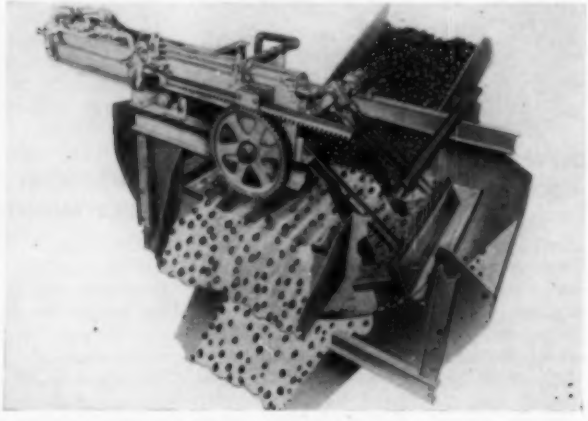
Heated Screen Shows Complete Redesign

New Model E Leahy Flexelex screen, made and distributed by Deister Concentrator Co., features a new jacket assembly and mounting arrangement which simplifies jacket-tensioning adjustment, facilitates mounting and demounting of jackets and makes it unnecessary to make electrical connections when changing jackets. New aluminum bus bars connecting the repositioned heating transformer with the screen contact bars are short and out of the way and offer high thermal and electrical efficiency as a result of generous bus cross-section and laminated construction. Flexible cables have been eliminated.



Vibratory Centrifugal Dewatering Screen

The Bird-Humboldt centrifugal drier employs a perforate, cone-shaped screen to effect thorough dewatering at continuous large-volume output through combined centrifugal and vibratory motion. Advantages listed by the supplier, Bird Machine Co., include high separating efficiency, high solids recovery, low power consumption and long screen life.



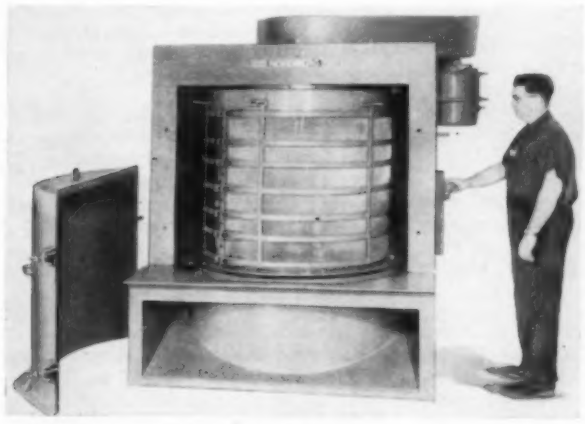
Simplicity, Efficiency in Heavy Media Unit

Wilmot OCC heavy-media system is said to offer high efficiency and economy because of its simplified design, low

power consumption, efficient sink removal, ready accessibility and easy supervision. The unit is available in six basic designs with capacities up to 400 tph, and may be operated in tandem to make a three-product separation (*Coal Age*, December, 1954, p 106). Bulletin from Wilmot.

New Filters With Propeller Agitators

New disc filters, Peterson TPA (top-entering propeller agitation) "Roto-Disc" units, are equipped with completely enclosed propeller agitators driven from above the reservoir level, thus eliminating glands and water seals within the reservoir itself. Uniform agitation is achieved through proper spacing of the propellers, the maker says, and the agitating mechanism may be removed as a unit and replaced without draining the tank. Furthermore, the propellers may be jogged to a start in the heavy solids at the bottom even after a power failure without draining the tank. Full details from Peterson Filters & Engineering Co.

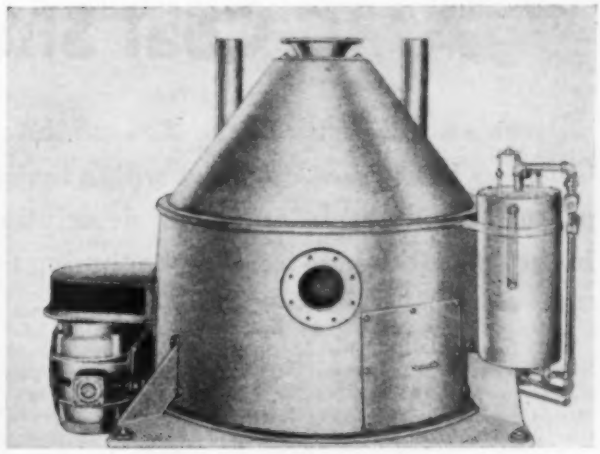


High Screen Capacity, Accurate Sizing

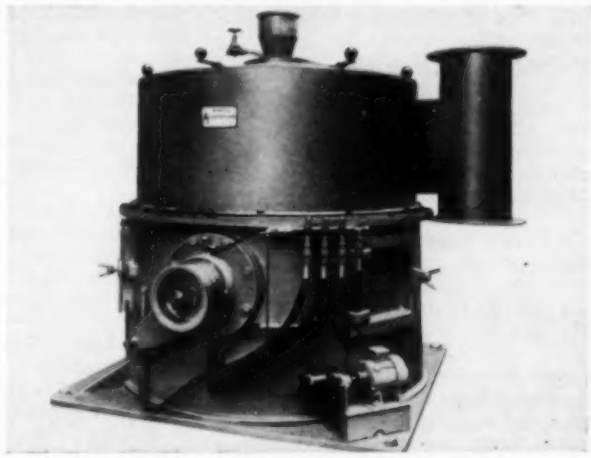
The Symons V-Screen, applicable to coal dewatering, dedusting and sizing, introduces a revolutionary screening principle that combines gravitational and centrifugal forces to provide high screening capacity and more accurate sizing in the finer sizes, reports the Nordberg Mfg. Co. The design offers double the screen action per square foot of cloth, handling down to 80 mesh, with up to 98% efficiency in actual installations, it is said. In dewatering, the V-Screen removes 50% more moisture with less coal degradation than with other methods, the company says. Bulletin P-28.

Centrifugal Drier Has Greater Capacity

The CMI Model EB-36 drier is said to use up to 24% less horsepower while handling more material. New design features include a V-belt direct drive which transmits power directly to the outer shaft and assures smoother, more positive performance under shock loads; and an improved basket design that increases capacity. Lining the basket on the inside is a fine-mesh screen through which water, soluble clay and pyrites are discharged. An enlarged, improved discharge channel permits

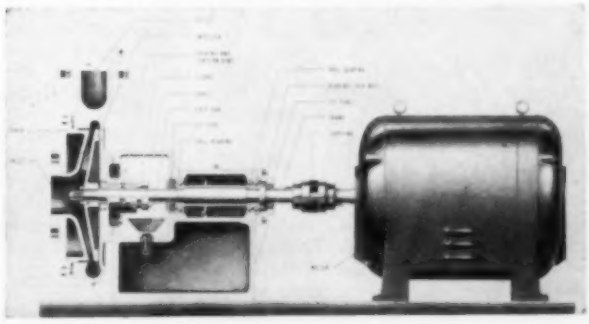


more efficient operation and reduces clogging, reports Centrifugal & Mechanical Industries, Inc.



Rotary Dewatering Unit Ups Recovery

First showing of a 25-in. Reineveld Centriplane was one of the features of the Heyl & Patterson display. The rotary unit is designed for dewatering slurries to effect maximum recovery of solids. Long-life, protected gearing and easy accessibility for maintenance are major features of the unit. A typical application employs a Centriplane to dewater the underflow of cyclones, which in turn are employed to thicken the effluent of a Reineveld centrifuge.



Corrosion-Resistant Pump Performs Better

The Dorr-Oliver Type L pump with new design and performance characteristics is especially suited for handling corrosive water or slurries. A major improvement is the design of the casing and the location of the discharge outlet, the manufacturer says. Location of the inlet and outlet in the same vertical plane simplifies piping arrangements. The unit is self venting and is said to hold prime better when the pump is in operation. Bulletin 310 from Dorr-Oliver.

Turn to p. 118 for More Equipment Show News

AMC Coal Show Exhibitors

Here's a full roster of the 225 exhibitors participating in 1955 American Mining Congress Coal Show, together with a listing of the major products and services displayed. Photographs and brief descriptions of new equipment and materials appear in the special "Show Report" beginning on p 92 of this issue.

ACF Industries, Inc., 30 Church St., New York 8—ACF mine cars, including latest-type all-steel drop-bottom mine car; ACF mine-car wheels; new articulated mine train.

Acme Machinery Co., Box 1169, Williamson, W. Va.—New Model 275 Acme self-propelled rubber-tired air compressor with built-in dust collecting system; Model HSJ stoper "Jumbolter".

Aerial Surveys, Inc., 4614 Prospect Ave., Cleveland 3, Ohio—Topographic maps made from aerial surveys; mosaics; reserve maps for stripping operations; aerial stockpile inventories.

Aeroquip Corp., 300 S. East Ave., Jackson, Mich.—Aeroquip flexible hose lines with detachable, re-usable fittings and self-sealing couplings; new "Socketless" line of hose and fittings.

Aero Service Corp., 210 E. Courtland St., Philadelphia 20—Air photos, photomaps and topographic mapping for geological study, timber-typing, estimating coal acreage, delineating crop lines, plotting boreholes, laying out access roads, planning rail spurs, computing overburden, and other engineering uses.

Allegheny Ludlum Steel Corp., 2020 Oliver Bldg., Pittsburgh, Pa.—Complete line of cemented-carbide cutting and drilling bits, including cutting-machine bits, finger bits, roof-bolting drill bits and coal-drill bits; and a variety of stainless tool and other alloy steels.

Allen-Sherman-Hoff Pump Co., 259 E. Lancaster Ave., Wynnewood, Pa.—"Hydroseal" and "Centriseal" materials-handling pumps, featuring Centriseal pump for handling abrasive and/or corrosive fluid-solid mixtures.

Allis-Chalmers Mfg. Co., Buda Div., 154th & Commercial Ave., Harvey, Ill.—New Buda Model GDAT-779 turbocharged diesel truck engine; Buda Model 8DC-2505 diesel power-shovel engine; Buda Model 8DAS-1125 torque-converter power unit; 7½-kw diesel generator set; Buda lifting jacks.

Allis-Chalmers Mfg. Co., General Machinery Div., Box 512, Milwaukee 1, Wis.—5x12-ft "Ripl-Flo" screen with "Thermo-Deck" heating unit and automatic stop control; "Low-Head" screen; coal-washing and rubber-lined pumps; general-purpose motors; "Texrope" V-belt drive equipment.

Allis-Chalmers Mfg. Co., Tractor Div., Box 512, Milwaukee 1, Wis.—New HD-21 crawler tractor with Gar Wood cable dozer; HD-15 tractor; HD-5G tractor with hydraulic dozer; TW360 motor wagon; AD-40 motor grader; WD-45 with back hoe.

American Brattice Cloth Corp., Box 187, Warsaw, Ind.—ABC brattice cloth in seven grades; ABC inflatable brattice; and new "Neolon" lightweight nylon-base tubing.

American Cable Div. and Hazard Wire Rope Div., American Chain & Cable Co., Wilkes-Barre, Pa.—"ACCO" wire rope and cables for mining, featuring new "VHS" high-strength wire rope.

American Chemsol Co., Coraopolis, Pa.—"Chemicals for the Coal Industry," including roof coating, standardized float-and-sink solutions, rust-preventatives, flocculants, froth-flotation reagents and weed killers.

American Cyanamid Co., Explosives Dept., 30 Rockefeller Plaza, New York 20, N. Y.—Explosives for mining, electric blasting caps and other blasting supplies.

American Manganese Steel Div., American Brake Shoe Co., 389 E. 14th St., Chicago Heights, Ill.—Amsco manganese-steel dipper for power shovels; automatic welder for building up tractor rollers and idlers; new semiautomatic MF (magnetic flux) welder; hardfacing rods and electrodes.

American Mine Door Co., 2037 Duener Ave., Canton 6, Ohio—New Model 30 track cleaner developed especially for thinner coal seams; electric switch thrower; "Little Chief" and "Mighty Midget" rock-dusters; a new air-powered door.

American Mine Supply Co., 404 Frick Bldg., Pittsburgh 19, Pa.—American spad gun, spads, and spad hangars, both insulated and plain types, for supporting brattice, electric and telephone lines, piping, etc.; new American M-1 fluorescent circular mine lights for underground use.

Anaconda Wire & Cable Co., 25 Broadway, New York 4—Anaconda mining cable, shovel cable, mine power cable, etc., including new shuttle-car cable.

Armco Drainage & Metal Products, Inc., 703 Curtis St., Middletown, Ohio—Armco tunnel liner; "Steelox" buildings for mine service; Armco pipe, including "Hel-Cor," spiral welded, corrugated metal and asbestos-bonded types.

Ashland Oil & Refining Co., 14th St. & Winchester Ave., Ashland, Ky.—Ashland and Valvoline Div. mine lubricants, including all-purpose lubricants, oils and greases; "Permatreat" coal-treating oils emphasizing effective treating of commercial-grade coals; and new Permatreat asphaltic fire-resistant mine-roofing spray compound and asphaltic mine-shaft seal.

Atlas Powder Co., Concord Pike & New Murphy Rd., Wilmington 99, Del.—Blasting supplies and equipment, including new "Shotmaster" condenser-discharge blasting machine.

Austin Powder Co., 458 Rockefeller Bldg., Cleveland 13, Ohio—Complete line of drilling equipment, including all types of coal, roof-drill and strip-mine augers; carbide cutting-machine bits and new "KerfMaster" throwaway bits; underground and strip drill bits; explosives and blasting supplies, including new AL-4 primer or booster for shooting "Akremite."

Baldwin-Lima-Hamilton Corp., Construction Equipment Div., Lima, Ohio.—Stripping shovels; coal-crushing plants; hydraulic cranes; Austin-Western graders.

Barber-Greene Co., 400 N. Highland Ave., Aurora, Ill.—New screening device for handling wet and fine materials; B-G conveyor installations for mining; belt-conveyor carriers, return idlers and other components.

Bearing Service Co., 4650 Baum Blvd., Pittsburgh 13, Pa.—Ball and roller bearings and anti-friction devices.

Bethlehem Steel Co., 701 E. Third St., Bethlehem, Pa.—New Bethlehem yieldable mine arch for heavy roof conditions; Bethlehem roof bolts and accessories; heavy-duty prefabricated mine trackwork; mine cars designed to individual requirements; forged mine-car wheels; Bethlehem wire rope for surface and underground application; hollow drill steel for rock drilling.

Bird Machine Co., South Walpole,

Mass.—Bird continuous centrifugal coal filter; Bird centrifugal "polisher" for cleaning up washery water; new Bird-Prayon continuous rotary horizontal pan-type vacuum filter; Bird-Young continuous drum-type vacuum filter; and new Bird Humboldt centrifugal drier for dewatering fine coal after cleaning.

Bixby-Zimmer Engineering Co., 961 Abingdon St., Galesburg, Ill.—Bixby-Zimmer all-welded stainless-steel screens of various types; new-design grizzly rod screen.

Blackhawk Mfg. Co., 5325 W. Rogers St., Milwaukee, Wis.—Hydraulic hand and service jacks; hydraulic "Porto-Power" equipment for maintenance, production and testing; hand service tools; new P-228 40,000-psi high-pressure hydraulic pump; new FZ-15 hydraulic maintenance assortment.

Boston Woven Hose & Rubber Co., Box 1071, Boston 3, Mass.—Complete BWH line of conveyor belting, V-belts, industrial hose, packing and tape, featuring new "Boston High Load" and "Boston Haul King" high-tension belting for conveyor and elevator installations.

Bowdil Co., Box 470, Canton 1, Ohio—Complete line of cutter chains for all types of mining machines; Bowdil bits and cutterbars.

Brake Engineering Co., 1510 Main St., Wheeling, W. Va.—New "Automatic Arc Compensator" mechanisms featured in brake and clutch friction bands and shoes.

Broderick & Bascom Rope Co., 4203 Union Blvd., St. Louis 15, Mo.—"Yellow Strand" wire rope and braided wire rope slings, featuring new extra strength Yellow Strand "Powersteel" wire rope.

Browning Dust Collector Co., Box 133, Hampden, W. Va.—Browning box-type and rotary dust collectors for roof drilling; Browning mobile utility truck; new pantograph arms with dust collector for mounting on mobile units.

Carboloy Dept., General Electric Co., Box 237, Roosevelt Park Annex, Detroit 32, Mich.—Complete line of mining tools and rock-drilling bits using Carboloy carbide tips made by various manufacturers.

Bucyrus-Erie Co., S. Milwaukee, Wis.—B-E shovels, featuring the Model 150-B 6-cu yd electric shovel.

Burndy Engineering Co., Norwalk, Conn.—Burndy electrical connectors for mining service, featuring new Burndy method of splicing flexible mining cable for either emergency repair at the face or permanent splicing in the shop; "Hylinks" for splicing feeder cable installed with a 4-34A "Hypress" 9-ton hydraulic tool weighing only 9 lb.

Cardox Corp., 307 N. Michigan Ave., Chicago 1, Ill.—"Airdox" coal breaking units, including new models of both stationary and semi-portable types; new diesel-driven Cardox Model 155 surface "AugerMiner"; portable drilling equipment, including a new tractor-mounted vertical drill.

Caterpillar Tractor Co., Peoria, Ill.—Caterpillar coal-hauling equipment and track-type tractors, including "Cat" DW20 tractor and Athey PH20 coal hauler; New D9 230-hp tractor; newly designed D8 tractor; 315-kw D397 electric set.

Centrifugal & Mechanical Industries, Inc., 146 President St., St. Louis 18, Mo.—New Model "EB-36" centrifugal drier with new pressure lubrication system; new CMI Clust-R-Clones.

Chicago Pneumatic Tool Co., 6 E. 44 St., New York 17—CP electric and air-operated roof-bolting equipment, including all-electric Model RBD-30 mobile roof-bolting unit which drills holes and sets bolts without repositioning; CP-134 short stoper and CP impact wrench combined for air-powered bolting; new CP integral sinker airleg mounting a CP-32A wet sinker for driving rock headings; and new lightweight handheld CP hydraulic coal drill.

Cincinnati Mine Machinery Co., 2980 Spring Grove Ave., Cincinnati 25, Ohio—Cincinnati cutter chains, cutter bars, sprockets and cutter bits, including redesigned trimming chain for Goodman and Marietta miners, newly designed chain for rotary-type mining-machine heads; new-type cutter chains for high production and high-speed machines; new Cincinnati cutterbars.

Cities Service Oil Co., 60 Wall Tower, New York 5—Lubricants for coal mining machinery, including "Trojan" grease, "Pacemaker T," "Sentry" and "DC Series" oils.

Clark Equipment Co., Construction Machinery Div., Miller St., Benton Harbor, Mich.—Newly developed line of Michigan tractor-shovels, including Models 12B, 75A, 125A and 175A; Model T-24 Michigan excavator-crane.

Clarkson Mfg. Co., Mine Rd., Nashville, Ill.—New Marietta continuous miner; conveyor flights for various loading machines and continuous miners.

Cleveland Rock Drill Div., Westinghouse Air Brake Co., 12500 Berea Rd., Cleveland 11, Ohio—Cleveland line of stopers, stoper arms, new dust-collection system and one-use bits, featuring a new-design S20 "Vac-Nu-Matic" stoper for roof bolting especially adaptable to low coal; and new Cleveland-BCR "Hydra-Miner" continuous-mining machine.

Coal Age, 330 W. 42 St., New York 36—Publishing service for the coal mining.

Coal Mine Equipment Sales Co., 306 Beasley Bldg., Terre Haute, Ind.—Rebuilt mining equipment, including cutting and loading machines, shuttle cars, locomotives, m-g sets and rotary converters, mine hoists, etc.

Continental Motors Corp., Muskegon, Mich.—Continental engines available in 92 basic models from 14 to 280 hp for gasoline, diesel, natural gas, LPG or fuel oil operation, for haulage, industrial or special applications.

Colorado Fuel & Iron Corp., Pacific Coast Div. and Wickwire Spencer Steel Div., 575 Fifth Ave., New York 22—CF&I wire rope; industrial space screens for mine use; rock bolts and accessories.

Combustion Engineering Co., Raymond Div., 1319 N. Branch St., Chicago 22, Ill.—C-E Raymond flash-drying system for fine coal; new dedusting system for use with C-E Raymond system.

Compton, Inc., 250 Monticello Ave., Clarksburg, W. Va.—New Model 28 coal auger and mining heads.

Cooke-Wilson Electric Supply Co., 3000 Oakhurst Rd., Pittsburgh 34, Pa.—Replacement parts for mining machines; gears and worms; and new conveyor-drive unit for JCM-3 and 20-BU loader featuring straight drive instead of former conical drive for easier assembly and maintenance, constructed of manganese bronze and aircraft-stock steel.

Cummins Engine Co., 1138 Fifth St., Columbus, Ind.—New Cummins "Turbo-diesel" truck engines, including 335-hp Model NRT-6 and 600-hp Model VT-6; new Cummins "PT" fuel system.

D-A Lubricant Co., 1331 W. 29th St., Indianapolis 23, Ind.—Complete D-A line of heavy-duty oils and lubricants, including new "Extra-Treated" diesel oil.

Dart Truck Co., 2623 Oak St., Kansas City 8, Mo.—Model 50SBDT bottom-dump coal hauler with capacity of 50 to 60 tons, featuring one of the diesel-powered tractor-trailer units in service for the Sunnyhill Coal Co. since it was shown at the 1953 Coal Show; diesel-powered 18-ton underground truck.

Davey Compressor Co., Kent, Ohio—New Davey Model M-8A truck-mounted rotary air-powered drill; portable, stationary and special-purpose air compressors from 75 to 600 cfm; pneumatic construction tools.

Deister Concentrator Co., 901 Glasglow Ave., Fort Wayne 1, Ind.—Deister Super-Duty Diagonal-Deck coal-washing table with anti-friction-bearing head motion; "Concenco" J-132 and J-136 spray nozzles; new Model E Leahy vibrating screen equipped with "FlexElex" screen-cloth heating unit; and new Concenco Model 208 feed distributor.

Detroit Diesel Engine Div., General Motors Corp., 13400 W. Outer Dr., Detroit 23, Mich.—G-M Models 6-110, 6-71 and 4-71 two-cycle diesel engines commonly used in LeTourneau-Westinghouse, Euclid and Koehring off-highway haulage equipment; G-M three-cylinder, two-cycle diesel engine.

Differential Steel Car Co., 310 E. Hardin St., Findlay, Ohio—Differential large-capacity, low-height eight-wheel mine car, measuring 24½ x 7 ft by 24 in and offering a capacity of 230 cu ft.

Dodge Mfg. Corp., Mishawaka, Ind.—Dodge line of power transmission products, including new "Flexidyne dry-fluid drive;" new Dodge "Air-Grip" clutch; new 60-hp "Torque-Arm" speed reducer; "Taper-Lock" conveyor pulley, V-belt sheaves, sprockets and couplings.

Dooley Bros., 1201 S. Washington Ave., Peoria, Ill.—New Dooley mobile hydraulic-electric roof drill for working heights from 30 to 80 in; mobile roof-drill parts.

Dorr-Oliver, Inc., Barry Pl., Stamford, Conn.—Horizontal and disc-type filters, thickeners, classifiers, cyclones, hydro-separators, "Dorrco" sizer, etc., for coal preparation; new Type L centrifugal pump.

Dow Chemical Co., Midland, Mich.—New "Separan 2610" flocculating agent for separation of water-dispersed solids in coal preparation.

Duff-Norton Co., 2709 Preble Ave., Pittsburgh 30, Pa.—Complete line of ratchet, screw and hydraulic jacks and mine-roof support jacks, including new Lo-Hite hydraulic jack with independent pump; Coffing Hoist Div. ratchet-lever, spur-gear and electric hoists.

E. I. du Pont de Nemours & Co., Inc., Textile Fibers Dept. and Explosives Dept., 11th & Market St., Wilmington 98, Del.—du Pont textile fibers used in conveyor belts, hose, tarpaulins, tires; du Pont "Ventube" for mine ventilation; new "Akremite" and "Nitramite" blasting agents.

Electric Steel Foundry, 2141 N. W. 25th Ave., Portland 10, Ore.—ESCO 4½-yd tapered dragline bucket; new swivel dump block; "Buck Forte" dozer-rooter; new-style bucket teeth; cutting edges and end bits; ESCO patented wedge-type dipper door; points, adapters, bucket rigging, etc.

Electric Storage Battery Co., Exide Industrial Div., 42 S. 15th St., Philadelphia 2, Pa.—"Exide-Ironclad" batteries for mine locomotives, trammers, shuttle cars, etc., featuring new exclusive "Silvium" grid alloy and extensive use of polyethylene in positive-plate construction for longer service life.

Ensign Electric & Mfg. Co., 914 Adams Ave., Huntington 4, W. Va.—New Ensign Bulletin 2102 explosion-tested cable reel for portable mine equipment; Ensign mine power distribution boxes featuring new mechanical breaker-tripping unit; Ensign low-resistance rail bonds; trolley-guard supports; cable splicers; centrifugal switches for belt conveyors; "Ensigneer" safety belt-conveyor control; Ensign-Clark mine-type magnetic starters, with AC and DC Standard NEMA 1 and USBM explosion-tested enclosures.

Enterprise Wheel & Car Corp., Bristol-Tenn., Va.—Enterprise "Custom-Engineered" mine cars, equipment and man-trip cars, including aluminum mine car shown after 2 yr of actual mine service.

Euclid Div., General Motors Corp., 1361 Chardon Rd., Cleveland 17, Ohio—New Euclid TC-12 "Twin Power" crawler tractor featuring twin motors of 194 hp each; new Model S-7 overhung-engine 7-yd scraper; Model TD 22-ton rear-dump haulage unit, spring mounted, with 300-hp engine and "Torqmatic" drive; Model UD 10-ton 138-hp rear dump with 10-speed transmission.

George E. Failing Co., Enid, Okla.—New Model CBH "Holemaster" self-contained highly mobile drill for fast drilling of vertical blastholes; new Failing "Logmaster" for borehole surveys.

Fairmont Machinery Co., Fairmont, W. Va.—New Fairmont fully automatic density control for Chance cones and dense-media vessels.

Femco, Inc., Box 32, Irwin, Pa.—New Femco "Bit Step" and "Bit Carrier" remote-control and indication systems for varied equipment applications; Femco communications systems, including "Trolleyphones" for locomotive dispatching, loudspeaking phones, "Cagephones" for deep or slope mines, "Audiphones" for plants and tipples; Femco permissible shotfiers; and Dage closed-circuit TV for monitoring and controlling various industrial operations.

Firth-Sterling, Inc., 3113 Forbes St., Pittsburgh 30, Pa.—Full line of mining machine bits, roof bits, drill bits, finger bits and drill-bit inserts.

J. H. Fletcher & Co., 707 W. 7th St., Huntington, W. Va.—Fletcher mobile roof drills, including Model DAF roof-control drill featuring a new floor-to-roof feed system; low-height 28-in Model DAE and medium-height 48-in Model DAB drills, with such optional equipment as cable reel, dust collector, hard-rock drilling attachment, etc.

Flexible Steel Lacing Co., 4607 Lexington St., Chicago 44, Ill.—Flexible belt fasteners; "Flexco" hinged fasteners and scraper plates; new Flexco power tools reducing application time up to 50%; and new "Rema" fast-acting self-vulcanizing rubber repair materials for conveyor belts.

Flood City Brass & Electric Co., Messenger & Elder Sts., Johnstown, Pa.—Trolley-line materials, headlights, controllers, electrical switches; replacement parts for mining machines, locomotives, pumps, etc.; and a mine pump of Flood City manufacture.

Fuel Process Co., Box 8455, S. Charleston, W. Va.—Latest applications of Belknap calcium-chloride coal-washing system, featuring an effective media-recovery system and automatic specific-gravity control.

Fulton Bag & Cotton Mills, 1400 Annunciation St., New Orleans, La.—Tamping bags and brattice cloth.

General Electric Co., Schenectady 5, N. Y.—New Type TLE-43 14-ton track-laying mine shuttle car; DC rectifier car for mine use; new Type MDY motor; USBM-rated motor; motor-control center and control desk; general-purpose controls; G-E wire and cable for mine service.

Geo-Optic Co., Inc., 170 Broadway, New York 38, N. Y.—"Askania" mining theodolite, surveying instruments, drawing machines and engineers' supplies, including aluminum-inserted and other special drawing papers.

Goodman Mfg. Co., Halstead & 48th Sts., Chicago 9, Ill.—Goodman mining equipment, including new Type 400 continuous miner; new Type 965 tractor-tread loading machine for low coal; new Type 870 26-in cable-reel shuttle car; Type 865 tractor-tread loader with a basic height of 28½ in and a capacity of 8 tpm; Type 570 48-in-high cable-reel shuttle car; Type 2400 rubber-tired cutting machine; and Goodman replacement parts.

Goodyear Tire & Rubber Co., Inc., 1144 E. Market St., Akron 5, Ohio—Goodyear conveyor belting, featuring a working model of the proposed 130-mi overland Ohio belt conveyor. Also featured were roof bolt compression pads designed to permit visual determination of bolt loads.

Gorman-Rupp Co., 305 Bowman St., Mansfield, Ohio—G-R line of general-purpose pumps, mine-gathering pumps, and special-application pumps.

Gould-National Batteries, Inc., 467 Calhoun St., Trenton 7. N. J.—Complete Gould line of all battery types for coal mine service, featuring the Gould "Plus-Performance Plan" for battery selection, servicing and maintenance; new Gould "Multi-Lite" rechargeable flashlight and battery, in hand and railroad-type cases.

Gulf Oil Corp., Gulf Bldg., Pittsburgh 19, Pa.—Gulf products for mining, including "Mining Machine Lubricant," cam grease, journal oil, coal-spray oil and "Harmony" oil for hydraulic use and lubrication of auxiliary equipment.

T. J. Gundlach Machine Co., 226 Centreville Ave., Belleville, Ill.—Gundlach two-stage double adjustable crusher in four standard sizes from 18- to 56-in rolls and featuring new hooked teeth instead of pyramid teeth on upper rolls to better grab lumps.

Hamilton Rubber Mfg. Co., Meade St., Trenton, N. J.—Conveyor belting for coal mine service, featuring "King Koal" belting and two new breaker strips of cotton tire cord or nylon; packing and hose, including "Revelation" cord suction hose.

Harnischfeger Corp., 4400 W. National Ave., Milwaukee 46, Wis.—New P&H electronic control for P&H electric shovels; P&H "Magnetorque" hoist drive for shovels.

Herb J. Hawthorne, Inc., Box 7366,

Houston 8, Texas—Hawthorne "Blue Demon" drill bits for rotary drilling with air or water, featuring replaceable throw-away blade bits; and new Blue Demon Types AC and DB insert rock bits, with replaceable blade bits equipped with tungsten-carbide inserts for cutting edges.

Hendrick Mfg. Co., Carbondale, Pa.—Perforated metals of all types; new "Wedge Wire" screens; "Wedge Slot" screens.

Hendrix Mfg. Co., Box 31, Mansfield, La.—Latest-model Henlrix stripping bucket featuring Hendrix cast 14% manganese-steel lip, chains and fittings.

Hercules Motors Corp., Canton, Ohio—Hercules engines and power units, typical of the more than 70 models designed to meet mining requirements and available from 3 to 500 hp, 2-, 4-, 6- and 8-cylinder gasoline and diesel models; new Model DOOD diesel engine carrying USBM approval for use underground.

Hercules Powder Co., Delaware Trust Bldg., Wilmington, Del.—Hercules permissibles and blasting supplies, including new "King-Size" cartridges offered in four lengths and small diameters, and new "Titan Blaster" condenser-type blasting machine.

Hewitt-Robins, Inc., 666 Glenbrook Rd., Stamford, Conn.—New "hi-G" vibrating screen; new "RoBINtronic" electronic bin-level indicator; modified new design of the Hewitt-Robins "Mine-aveyor," a shuttle-type belt conveyor for use in continuous mining; new Super Raynile belt; all types of industrial hose.

Hewitt Rubber Co. of Pittsburgh, 100 Ferry St., Pittsburgh 22, Pa.—Newly introduced "Minet" hinge-type conveyor-belt splice.

Heyl & Patterson, Inc., 55 Fort Pitt Blvd., Pittsburgh 22, Pa.—New Reineveld "Centriplane," in 25- and 8-in sizes, for dewatering slurry; 36-in Reinevelt centrifuge; H&P cyclones in various sizes; H&P car dumper; new fluidized bed drier.

Robt. Holmes & Bros., 510 Junction Ave., Danville, Ill.—Holmes Baughman "VertiVane" thermal driers for moisture reduction in coal 1½ in and smaller; Holmes coal-lowering spirals; laboratory crushers and pulverizers; Holmes hoisting equipment, including hoists, sheaves, skips, cages, and automatic skip and cage loading and dumping devices.

Hydramotive, Inc., 6723 Denison Ave., Cleveland 2, Ohio—New "Hydrotor" hydraulic cranking motor for diesel and gasoline engines; hydraulic accumulators in capacities from 30 cu in to 10 gal for working pressures of 3,000 psi.

Industrial Wheel Co., 24141 Ann Arbor Trail, Dearborn 6, Mich.—Adaptors for changeover from pneumatic tires to U. S. Rubber "Mine Cushion" solid-type tires for Joy 6-SC and 8-SC, Jeffrey MT66 and Goodman 670 shuttle cars.

International Harvester Co., Industrial Power Div., Melrose Park, Ill.—New International "75 Payscraper," an 18-yd rubber-tired high-speed earthmover; new International TD-24 torque-converter diesel crawler tractor; International-Drott TD-14A "Skid-Shovel," a new 141 Series crawler unit with stronger track assembly.

International Harvester Co., Motor Truck Div., 180 N. Michigan Ave., Chicago 1, Ill.—International trucks for mine service, featuring Model RF-230 off-highway unit of 60,000-lb gvw rating, 201-hp RD-501 engine, designed for larger loads than more conventional models, for shock loads and for hauling heavier loads over semi-improved roads.

Irwin Foundry & Mine Car Co., Box 311, Irwin, Pa.—New feeder conveyor for transfer of coal from shuttle cars; Irwin 8-wheel "Streamliner" mine car; 8-wheel "ManVan" car; Irwin patented 4-wheel mine-car trucks; conveyor chain; patented safety hook for coupling pins.

I-T-E Circuit Breaker Co., 19th & Hamilton Sts., Philadelphia 30, Pa.—I-T-E Type KSC automatic reclosing circuit breaker, Type KB "Urelite" air circuit breaker, electrically operated; line of molded-case air circuit breakers; I-T-E "Electro Clutch."

Jeffrey Mfg. Co., 922 N. Fourth St., Columbus 16, Ohio—Jeffrey mining equipment including new-type 76-AM Colmol continuous-mining machine; improved 76-B Colmol featuring a swinging discharge conveyor and varied design improvements; latest-type "Molveyor" train of wheel-mounted belt conveyors for continuous haulage, featuring increased ability to articulate both horizontally and vertically, "Minet" splices on belt, more positive controls, in 24- and 30-in models with belt speeds of 300 and 400 fpm, respectively; new 81-A crawler-mounted loading machine; new 6F Series "Aerodyne" fan; new lightweight A9A handheld hydraulic drill; MT-66B shuttle car available in 36- to 48-in heights with capacities from 3.3 to 5.5 tons; 34-F continuous-mining machine; 30 x 36-in double-roll coal crusher; Jeffrey-Traylor vibrating pan feeders; Jeffrey belt idlers, carriers and accessories; Jeffrey replacement parts.

Johns-Manville Sales Corp., 22 E. 40th St., New York 16, N. Y.—J-M corrosion-resistant "Transite" pipe for mine drainage, water lines and exhaust ducts; packings and gaskets for slushers, pumps, etc.; assorted sealing compounds for various services; asbestos friction materials designed to withstand increased loads and greater machine speeds on shovels, draglines, hoists, etc.; and asbestos building materials, such as, corrugated and flat Transite for tipples and fire barriers.

Jones & Laughlin Steel Corp., 3 Gateway Center, Pittsburgh 30, Pa.—J&L wire rope for mining, including new "SpringKore" and "PlastiKore" rope and new "JalKlamp" terminal splice; "Jalloy" and "Jalten" special alloy steel for mine applications.

Joy Mfg. Co., Oliver Bldg., Pittsburgh 19, Pa.—Joy mining equipment, including new "Twin Borer," 1CM-2 and 3JCM-4 continuous-mining machines; new Joy extensible belt and room belt; new 20-BU-3 loading machine; 12RB cutting machine; 8-SC and new 9-SC shuttle cars; RBD-15 and RBD-11 mobile roof-bolting drills; new "Limberoller" and standard belt idlers and sections; new Joy cutter chain and bar; new "Copperhead" bits; new "Surgepruf" hydraulic hose and couplings; new "QuikLoc" electrical connectors; new lightweight hydraulic chain saw; Joy drills and stopers; mine blowers and fans; power distribution systems; cable fault finder; Model "225" blasthole drill for rotary air-blast drilling; and Joy replacement parts.

Kanawha Mfg. Co., Charleston, W. Va.—Kanawha coal preparation plants.

Keenan Oil Co., Parkway Dr., Cincinnati, Ohio—"Keenoil" No. 7 coal-spray oil, featuring new additives designed for better penetration to lower costs of coal spraying, get more uniform appearance, etc.

Kennametal, Inc., Latrobe, Pa.—Kennametal tungsten-carbide cutting bits and drilling tools, including a new application of tungsten carbide for percussion drilling, and three continuous-miner bits for all types of machines.

Kensington Steel Co., 503 Kensington Ave., Chicago 28, Ill.—"Oro" alloyed-manganese steel castings of improved design and metals for repair and replacement of parts subject to wear and strain on stripping and loading shovels, tractors, chain conveyors and elevators, preparation and crushing equipment.

Kern Instruments, Inc., 120 Grand St., White Plains, N. Y.—Kern (Swiss) surveying and engineering instruments, including new "Planetable Alidade"; special optical "plummet" for plumbing of vertical shafts or structural members; and new metal-leg centering tripod.

Knapp Mills, Inc., 23-15 Borden Ave., Long Island City 1, N. Y.—"Guidler" hyperbolic belt-control mechanism for guiding all types of belts, available in five sizes for both conveyor and power-transmission applications; metallic-lead lubricant for all types of open gears and bearings, open and enclosed chains, wire rope and cable.

Koehring Co., 31st & Concordia Ave., Milwaukee 10, Wis.—Improved Koehring "Dumptor" off-road hauling unit with 6-cu yd gravity dump, providing fast, powerful two-way shuttle haulage without turning for increased production and lower haulage costs; new 1-yd Koehring 405 shovel.

Koppers Co., Inc., Wood Preserving Div., 701 Koppers Bldg., Pittsburgh 19, Pa.—Pressure-creosoted mine ties.

Laboratory Equipment Co., St. Joseph, Mo.—Equipment and methods for rapid determination of sulphur content of coal.

Lecco Machinery & Engineering Co., 1607½ Bland St., Bluefield, W. Va.—New Lecco Model 02-22 5 x 14-ft single-deck horizontal vibrating screen—a new-type heavy media rinse screen; new Lecco horizontal vibrating conveyor, 20 in by 12 ft; and "Lecco-Vib" Model C1-20 4 x 8-ft double-deck inclined-type scalping screen.

Lee-Norse Co., Charleroi, Pa.—New Lee-Norse CM36X Miner for seams from 42 to 84 in; new Lee-Norse "Mine-Portal Bus"; and Lee-Norse "Drive Wheel Friction" for protection of gearing, shafts and universals in shuttle-car wheel units on 5-SC, 6-SC and 8-SC cars.

Leschen Wire Rope Div., H. K. Porter Co., Inc., 2727 Hamilton Ave., St. Louis 12, Mo.—"Hercules Red Strand" wire rope for mining in various types, sizes and constructions; wire-rope slings.

LeTourneau-Westinghouse Co., Box 240, Peoria, Ill.—New B "Tournapull" with B scraper; C Tournapull rear-dump unit, featuring an increased capacity of 22 tons; C "Tournatractor."

Lincoln Engineering Co., 5701 Natural Bridge Ave., St. Louis 20, Mo.—Lincoln centralized lubrication systems, power-operated drum pumps, grease guns, fittings, hose and accessories, including new air-operated "Power-Drive" centralized lubricating systems.

Link-Belt Co., 307 N. Michigan Ave., Chicago 1, Ill.—New Link-Belt "Straightline" vibrating screen especially designed for handling and dewatering coal; Link-Belt "Multi-Louvre" drier for fine-coal application; precision chains, anti-friction bearings and belt-conveyor components.

Long Co., Box 331, Oak Hill, W. Va.—Equipment for Long "Piggyback" conveyor continuous-haulage mining, featuring the new Model 88 "Pigloader," PT-15 Piggyback conveyor and Long room conveyor; Long "lift-out" conveyor pan and "Superflite" chain; new Long Model M500 mobile conveyor head.

Ludlow-Saylor Wire Cloth Co., 634 S. Newstead Ave., St. Louis 10, Mo.—Wire cloth in a wide range of types, including "Arch Crimp," "Double Crimp," "Intermediate Crimp" and "Sta-Smooth" in square openings; "Rek-Tang," "Sta-Clear" and "Sta-Thru" in slotted openings, both in abrasion-resistant metal, such as, "Super-Loy" and corrosion-resistant stainless steel; hook strips and hooked edges for all types of vibrator screens.

Lukens Steel Co., Coatesville, Pa.—"Stainless-Clad" coal-handling equipment, including hoppers, chutes, pipes, etc.; Lukens "T-1" steel, a new construction material for use wherever impact and abrasion reduce equipment life.

Macwhyte Co., 2931 14th Ave., Kenosha, Wis.—"Monarch Whyte" strand, improved plow steel, "PREformed" and internally lubricated wire rope, with strengths ranging from 185 lb to over 400 tons for all types of open-pit and underground equipment; wire-rope slings, including eight-part round-braided and flat-braided types; swaged cable assemblies and fittings.

McLanahan & Stone Corp., Hollidaysburg, Pa.—Coal crushers in various types and sizes, including "Bantam Buster" single-roll unit for primary and secondary reduction, and a new-design "Black Diamond" double-roll crusher for medium-fine and fine reductions.

McLaughlin Mfg. Co., Inc., 801 E. Cass St., Joliet, Ill.—Drilling tools for underground and strip mining, including augers, bits, heads, chucks, sockets and adaptors for handheld, post- and machine-mounted drills; complete line of forged shanked roof rods; new-type No. 4-LC carbide finger bits and new 16-G holder.

McNally-Pittsburg Mfg. Corp., Pittsburg, Kan.—McNally-Pittsburg dense-media, drying and other coal preparation equipment and plants.

Marion Power Shovel Co., Marion, Ohio—Marion stripping shovels, draglines, coal loaders and other excavating equipment, featuring the new 60-yd Hanna shovel now under construction.

Martindale Electric Co., Box 617, Edgewater Branch, Cleveland 7, Ohio—Electric motor and generator maintenance, including undercutters, commutator grinding tools and materials, and Martindale shop-type undercutter for large armatures; ammeter tong test meters and insulation ohmmeter-voltmeter circuit testers.

Mechanization, Inc., 1120 Munsey Bldg., Washington, D. C.—Publishing services for the coal industry.

Mine Safety Appliances Co., 201 N. Braddock Ave., Pittsburgh 8, Pa.—Edison "R-4" cap lamps and self-service charging racks for miners' cap lamps; a new trip lamp employing the R-4 battery; MSA "Bantam" rock-dust distributor featuring high discharge rate through optional wetting nozzle; MSA bolt-hole cleaner for safe rock drilling through maximum dust-collecting efficiency, and a new canister-type collector; MSA "MinePhone" for effective mine communication; and a complete line of first-aid materials, self-rescuers, methane detectors, oxygen-breathing apparatus and head protection.

Mining Congress Journal, Ring Bldg., Washington 6, D. C.—Publishing services for the coal industry.

Mining Machine Parts, Inc., 2701 St. Clair Ave., Cleveland, Ohio—MMP replacement parts for mining machinery, new mercury relay tubes and contactor-relay operating coils and blowout coils.

Mining Progress, Inc., Highland Mills, N. Y.—New "Westfalia Conversion Equipment" for fully mechanical coal getting, based on the original Löbbe Hoebel "German Coal Plow" but utilizing separate drives for conveyor and plow.

Mining & Quarrying, 231 E. 51st St., New York 22, N. Y.—Publishing services for the coal industry.

Mitchell Industrial Tire Co., Inc., Box 468, Chattanooga, Tenn.—"Mitco" solid-type tires, featuring the new Mitco "Mine Tire" especially constructed for mine use on shuttle cars, loader and other mobile machinery.

Morris Machine Works, Baldwinsville, N. Y.—Line of centrifugal slurry and dredge pumps for handling abrasive materials.

Myers-Whaley Co., Inc., Box 789, Knoxville 1, Tenn.—Whaley "Automat" loading machines; new Whaley crawler-mounted transfer car for transfer of material to cars or conveyors.

National Electric Coil Co., 800 King Ave., Columbus 16, Ohio—Replacement coils for motors and generators, featuring application of varied new insulating materials, such as, "Mylar" film and combinations, "Teflon," "Mica Matt" and advanced catalytic sitting resins, to provide upgrading of motor performance and longer service life through their use.

National Malleable & Steel Casting Co., 10600 Quincy Ave., Cleveland 6, Ohio—Willison automatic mine-car coupler; National NC-1 truck; National "Multi-Pad" rubber-cushioning devices; new Type F interlocking coupler and attachments for large-capacity strip-mine cars.

National Mine Service Co., Box 32, Beckley, W. Va.—New sintered-plate nickel-cadmium Sonotone storage batteries for mine applications; new Wheat metal charging rack for electrically controlled automatic charging of cap lamps; "Permi-Seal" tamping plugs for faster stemming; Hayden belt-fastening equipment with new presealed splicing designed to prevent seepage of fines through splice; Joy 6-SC shuttle car rebuilt and converted from non-permissible to permissible model as an example of the Joy rebuilding service of the Ashland Div.; new moisture absorbent to prevent corrosion within electrical compartments; Kennametal mining tools; "Safe-Cable" rebuilding and splicing of trailing cables; Bullard safety miners' caps; National Model flame safety lamps in both aluminum and steel, with new steel small-sized model; new Riken gas indicator; Scandura fireproof conveyor belting; and genuine Joy replacement parts.

Newcomer Products, Inc., Dailey Ave. Ext., Latrobe, Pa.—"NP" carbide-tipped cutting-machine bits; roof-drill and drill bits made of "Controlled Quality" carbide of "twist" design offering outstanding free-cutting, non-clogging features.

Nolan Co., Bowerston, Ohio—New Hein, Lehmann radial screening plant for preliminary dewatering to be made and sold in the U. S. by Nolan; Nolan hydraulic "Porta-Feeder" mine-car handling device and hydraulic dolly for

transporting Porta-Feeder; Nolan gear-driven rotary dumps; Phillips automatic cross-over dump, now made and sold by Nolan Co., and automatic loading station equipment.

Nordberg Mfg. Co., Milwaukee 1, Wis.—"Symons V-Screen" introducing a screening principle that combines gravitational and centrifugal forces for high capacity and more accurate sizing in the finer sizes; Type F Symons screen, providing level screening, higher capacity and accurate sizing.

Ohio Bell Telephone Co., 750 Huron Rd., Cleveland, Ohio—Communication instruments and systems.

Ohio Brass Co., 380 N. Main St., Mansfield, Ohio—New O-B circuit interrupter for short-circuit protection; new O-B 1,500-amp quick-break section insulator switch; new O-B hollow-screw combination feeder-trolley clamp; O-B expansion shells and plugs for roof support; trolley and feeder line materials; automatic couplers; locomotive current collectors; rail bonds, fused trolley taps and ground clamps; motor starters; and other safety and control equipment.

Ohio Carbon Co., 12500 Berea Rd., Cleveland 11, Ohio—Brushes for mine motors, generators, etc.

The Okonite Co., Hazard Insulated Wire Works Div., Passaic, N. J.—New "Hazacord Red Saddle" twin shuttle-car power cable and complete line of Hazacord "Mold-Cured" portable power cables for mine application.

Olin Mathieson Chemical Corp., Explosives Div., East Alton, Ill.—Armstrong coal breaker; complete line of industry explosives, blasting caps, Ramset powder-actuating fastening tools.

Orefraction, Inc., 7425 Thomas St., Pittsburgh 6, Pa.—Orefraction magnetite for heavy-media systems, featuring new "Superfine Grind" for more economical recovery.

Osmose Wood Preserving Co. of America, Inc., 980 Ellicott St., Buffalo 9. N. Y. —Osmose timber-preserving methods and products, including "Osmosalts," "Osmoplastic," "MTM" and new "Pentox" for seasoned wood; protective coatings and specialty chemical products.

Page Engineering Co., Clearing Post Office, Chicago 38, Ill.—New Page Model 721 walking dragline; 7-cu yd armored stripping bucket; various cast bucket fittings.

Pattin Mfg. Co., Box 527, Marietta, Ohio—Roof-bolting materials, including new Style D-2 expansion shell with limit stop that has proved particularly effective in soft roof.

Penn Machine Co., 106 Station St., Johnstown, Pa.—Replacement parts for all types of coal cutting, loading and haulage equipment; newly designed worms and worm wheels for shuttle cars to make each wheel interchangeable, and featuring steel centers for more strength and longer spline life; "Everlast Super Weld" rail bonds.

Peterson Filters & Engineering Co., 137 Social Hall Ave., Salt Lake City, Utah—Peterson "Flag Line Construction" filters, including the TFR (top-feed-reservoir) filter and disc filter with "Dual Guide" one-piece stainless-steel scraper to maintain maximum scraper life with woven-wire stainless-steel filter medium; new Peterson "Roto-Disc" thickener used to supplement gravity thickeners for refuse slime thickening and dewatering in closed circuits.

Pittsburgh Screw & Bolt Corp., Box 1708, Pittsburgh 30, Pa.—"Pit-Bolt" roof bolts and accessories; fasteners for general use in coal mining.

Post Glover Electric Co., 221 W. Third St., Cincinnati, Ohio—Resistors for all types of mining equipment; automatic transfer switches for mine locomotives; reel contactors; welders; electric heaters, natural and forced convection.

Productive Equipment Corp., 2926 W. Lake St., Chicago 12, Ill.—"Gyroset" vibrating screens, featuring special construction to provide for cross-slot bar screens and improved bottom suspension in base-mounted units.

Frank Prox Co., Inc., 1201 S. First St., Terre Haute, Ind.—Coal-cutting equipment, including cutter chains for all types of machines, sprockets, cutter bars and throwaway bits.

Pure Oil Co., 25 E. Wacker Dr., Chicago 1, Ill.—Industrial oils and greases.

Quaker Rubber Co., Div. of H. K. Porter Co., Inc.—New fire hoses; Quaker conveyor belting for mine service.

Raybestos-Manhattan, Inc., Manhattan Rubber Div., Passaic, N. J.—Industrial rubber products, conveyor belting and hose, including new-type "Homoflex" belt; new "Wed-Lok" splice; new "Poly-V" transmission; "Homocord" and "Homoflex" general-purpose belts; "Rayman" conveyor belt for high lift, super tension; and "Buronik" safety trolley-wire guard.

Reich Bros. Mfg. Co., 1439 Ash St., Terra Haute, Ind.—Reich heavy truck-mounted rotary blasthole drill with built-in hydraulic leveling jacks, designed for one-man handling of entire drilling operation and capable of exerting 20,000-lb down pressure on drill bit. Unit also has infinitely variable pull-down and rotational controls.

Reliance Electric & Engineering Co., 1088 Ivanhoe Rd., Cleveland 10, Ohio—New line of "Super T" DC motors; new Reliance "Totally Protected" AC motors.

Republic Steel Corp., Republic Bldg., Cleveland 1, Ohio—Republic mine roof bolts and plates, including new types with added safety and performance values; flexible and semirigid plastic pipe and fittings, featuring new "Kralastic" plastic pipe with new strength and corrosion-resistance features; products made of "Enduro" stainless steel for mine applications.

H. H. Robertson Co., 2400 Farmer's Bank Bldg., Pittsburgh 22, Pa.—"Galbestos" protected metal roofs and sidewalls; new "M-Panel" insulated wall construction; power and gravity ventilators.

Roberts & Schaefer Co., 130 N. Wells St., Chicago 6, Ill.—R&S equipment and plants for coal preparation.

John A. Roebling's Sons Corp., Div. of Colorado Fuel & Iron Corp., 640 S. Broad St., Trenton 2, N. J.—Roebling wire rope and electric wire and cable, including new "Royal Blue" line of wire ropes; and new and improved parallel twin mining-machine cable.

Rome Cable Corp., 330 Ridge St., Rome, N. Y.—Complete line of "Rome 60" neoprene-sheathed portable cords and cables for mobile equipment and mine power distribution, including new polyethylene insulated and sheathed mine power cable for high-voltage distribution.

Rust-Oleum Corp., 2425 Oakton St., Evanston, Ill.—Rust-Oleum rust-preventive coatings, including new "Galvinoleum" for coating galvanized metals without etching.

Salem Tool Co., 764 S. Ellsworth Ave., Salem, Ohio—McCarthy coal-recovery drills for underground mining, including two new compact, more powerful units; McCarthy coal-recovery drills for augering in strip pits; horizontal and vertical highwall shothole drills; drilling heads, augers, mining tools, etc.

Sanford-Day Iron Works, Inc., 612 Dale Ave., Knoxville, Tenn.—Sanford-Day bottom-dumping coal-handling system, including latest-model automatic drop-bottom mine car, jerkout unlatching device and closer; the Sanford-Day brakeman car; S-D outside-frame-construction Granby-type car; Brown-Fayro new-type barge and railroad-car mover; HKI hoist, oil-spray equipment; "Gismo" mucking and transporting machine; track accessories, valves, etc.

Schramm, Inc., West Chester, Pa.—New Rotadrill mounted on Pneumatractor.

Schroeder Bros., 3116 Penn Ave., Pittsburgh 1, Pa.—New "Hydra-Luber" for pressure lubrication; automatic hydraulic car-spotting and car-loading equipment; hydraulic coal drill; hydraulic power units, test and filter equipment, devices, controls and maintenance equipment.

Shell Oil Co., 50 W. 50th St., New York 20, N. Y.—Shell products for improved lubrication of mine equipment, including "Alvania" multipurpose grease; "Rotella" and "Rimula" heavy-duty engine oils for severe lubrication problems; and Shell "Tellus" oils for efficient hydraulic power transmission.

Simplex Wire & Cable Co., 79 Sidney St., Cambridge 39, Mass.—"Tirex" cords and trailing cables; "Anhydrex" borehole,

shaft and feeder cables, and new tougher jacketing.

SKF Industries, Inc., Front St. and Erie Ave., Philadelphia 32, Pa.—SKF anti-friction bearings and pillow blocks; Tyson tapered roller bearings.

Snap-On Tools Corp., Kenosha, Wis.—Electric impact wrenches; impact guns and nut runners; special diesel-engine tools; gear pullers, socket-type hex-tread wrenches; standard specialized maintenance tools; "Torquometers" for testing roof bolts.

Socony-Mobil Oil Co., Inc., 26 Broadway, New York 4, N. Y.—Hydraulic oils, lubricants and greases.

Solvay Process Div., Allied Chemical & Dye Corp., 61 Broadway, New York 6, N. Y.—Solvay calcium chloride for freeze-proofing and dustproofing coal, and surfacing strip-mine and underground roads.

Spencer Chemical Co., 610 Dwight Bldg., Kansas City, Mo.—Commercial-grade ammonium nitrate for use in new "Akremite" blasting method (*Coal Age*, May, 1955, p 70).

W. R. Stamler Co., Paris, Ky.—New Stamler "Shortie" car spotter and new Stamler automatic loading-station controls.

Standard Oil Co. (Indiana), 910 S. Michigan Ave., Chicago 80, Ill.—"Standard" lubrication engineering, research, technical services and supply facilities for the mining industry.

Standard Oil Co. (Ohio), 3083 Broadway, Cleveland, Ohio—New "Sohitac" series lubricants designed for open gears and wire rope; "Sohivis" multipurpose oils; other "Sohio" lubricants for mining.

Stearns Magnetic, Inc., 635 S. 28th St., Milwaukee 46, Wis.—Magnetic separators, featuring new electro-magnetic pulley of two-coil design.

Templeton, Kenly & Co., Gardner Rd., Broadview, Ill.—"Simplex" line of roof-support jacks; mechanical and hydraulic jacks and pullers, 5- to 600-ton capacities; specialized jacks and pullers; new "Simplex Re-Mo-Trol" remotely controlled hydraulic portable puller; and new "Simplex Rol-Toe" hydraulic jack.

Texas Co., 135 E. 42nd St., New York 17, N. Y.—"Texaco" products for lubrication of coal-mine equipment.

Timken Roller Bearing Co., 1835 Dueber Ave., S. W., Canton 6, Ohio—Timken tapered roller bearings and rock bits.

Tool Steel Gear & Pinion Co., Elmwood Pl., Cincinnati 16, Ohio—Hardened gears, pinions, sprockets, sheave wheels, shafts, etc., for mine equipment.

Trabon Engineering Corp., 1814 E. 40th St., Cleveland 3, Ohio—Fully automatic lubrication systems for all types of underground mining equipment, with hydraulically or air-operated lubricant pumps; automatic lubrication systems for various types of tipples, conveyors and coal-cleaning machinery; new series of mechanical-, hydraulic- and air-operated pumps.

Tri-County Building Service, P. O. Box 405, Taylorville, Ill.—Packaged stoppings made of galvanized-steel telescoping sections.

Twin Disc Clutch Co., 1328 Racine St., Racine, Wis.—Twin Disc torque converters and fluid couplings for trucks, locomotives, shovels, hoists and other mining equipment; friction clutch and power take-off units.

W. S. Tyler Co., 3615 Superior Ave., Cleveland 14, Ohio—"Ty-Rock" 5 x 12-ft double-deck vibrating screen; "Ro-Tap" testing sieve shaker; Tyler standard-screen-scale testing sieves; woven-wire screens.

Union Wire Rope Co., 21st & Manchester Ave., Kansas City, Mo.—"Tuffy" dragline, scraper, dozer and sling ropes for mining; Tuffy hoist lines.

United Engineers & Constructors, Inc., 1401 Arch St., Philadelphia 5, Pa.—Chance coal-cleaning process.

U. S. Bureau of Mines, Washington 25, D. C.—Bureau's services and publications in the field of mine safety and health.

United States Rubber Co., Rockefeller Center, New York 20, N. Y.—"Super Ustex" nylon conveyor belt; "U. S. Royal Gold" mining-machine cable; new "Royal Master" portable cord.

United States Steel Corp., 525 William Penn Pl., Pittsburgh 30, Pa.—"Cor-Ten," "Man-Ten" and "Tri-Ten" high-strength steels and products of various divisions as follows:

American Steel & Wire Div., USS—American cord and cable; "Tiger Brand" wire rope; rail bonds.

National Tube Div., USS—Plastic pipe.

Specialty Products Div. and High Strength Steel Div., USS—Mine car made of USS "Cor-Ten" steel; mine-car trucks of latest USS design.

Stainless Steel Div., USS—Stainless-steel roofing and siding.

USS Supply Div.—T-1 steel for mining applications.

Varel Mfg. Co., 9230 Denton Dr., Dallas, Tex.—Model 540-B "Jet-Rig" rotary air drill for holes up to 7⅞ in; Varel rotary cone-type and blade-type drilling bits and related items.

Vascoloy-Ramet Corp., 800 Market St., Waukegan, Ill—Tungsten-carbide mining tools, roof-type drill bits and auger bits, featuring new-type roof drill bit, rotary drill bit for stripping, and percussion bit for rock drilling.

Victaulic Co. of America, Box 509, Elizabeth, N. J.—Victaulic standard "Snap-Joint" lightweight couplings, including new 6-in size, and new split gaskets for easier assembly; "Roust-A-Bout" couplings for plain-end pipe; couplings for cast-iron pipe; Victaulic full-flow elbows, tees, reducers, etc.; plastic inserts for flexible plastic pipe; "Vic-Groover" portable pipe tools.

Warren Refining & Chemical Co., 5151 Dennison Ave., Cleveland 2, Ohio—Special-purpose lubricants; "Plastilube" multipurpose lubricant; new "Plasti-shield" lubricant; new "Storm King" aluminum roof coating.

Watt Car & Wheel Co., Barnesville, Ohio—Watt mine-car designs.

Weatherhead Co., 300 E. 131st St., Cleveland, Ohio—New swaging process and equipment, and full line of hydraulic fittings.

Wedge Wire Corp., Wellington, Ohio—Wedge Wire "Kleenshot" screens in various constructions, featuring new Marcel-type screening, and screening down to 65 mesh.

S. K. Wellman Co., 200 Egbert Rd., Bedford, Ohio—Powered-metal friction material in discs and brake lining for underground and stripping machinery.

Western Machinery Co., 760 Folsom St., San Francisco 7, Calif.—Coal-cleaning plant design and construction; HMS drum separators, Fagergren flotation cell and new "Torque-Flow" solids-handling pumps.

Westinghouse Electric Corp., 3 Gateway Center, Pittsburgh 30, Pa.—USBM-approved explosionproof motors; explosionproof and standard controls; 300-kw portable ignitron rectifier; 300-kva nitrogen-filled hermetically sealed transformer; mine sectionalizing switch.

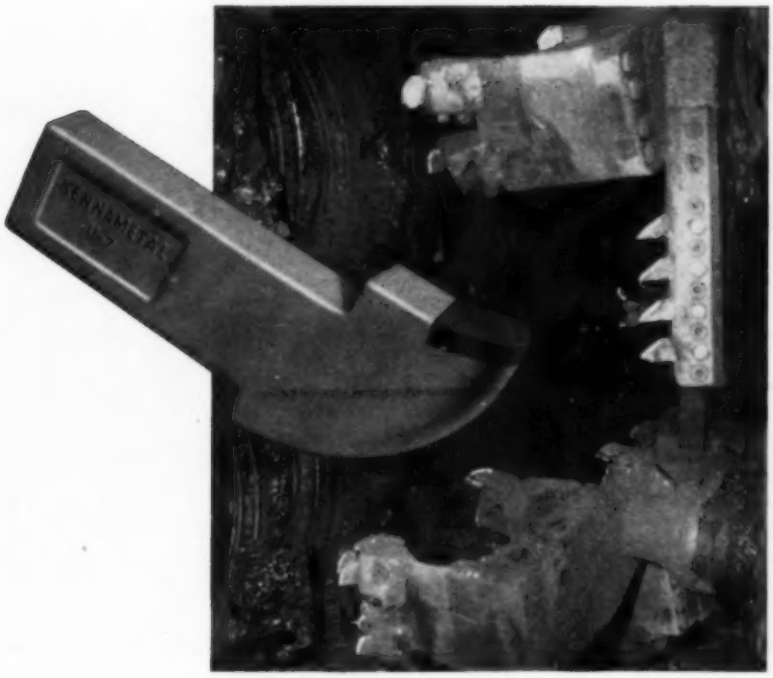
West Virginia Steel & Mfg. Co., Box 118, Huntington, W. Va.—Full line of roof bolts and accessories, including new "Wedgegrip" expansion unit and "Finger-type" and "Standard" expansion units; standard trackwork; fence posts and concrete reinforcing bars for mine property use.

Whitney Chain Co., 237 Hamilton St., Hartford 2, Conn.—Expanded line of Whitney "Mine-Service" chains, including universal-joint chains; shuttle-car, conveyor and continuous-miner chains; special-purpose and standard pre-packaged chains.

Wild Heerbrugg Instruments, Inc., Main & Covert St., Port Washington, N. Y.—Full line of Swiss-made optical surveying equipment, featuring the T-1 optical repeating transit particularly suitable for mine use.

Wilmot Engineering Co., 1101 Markle Bank Bld., Hazleton, Pa.—Wilmot cone cleaner, classifiers and froth-flotation units; new "Wilmot OCC" vessel for heavy-media separation.

Yara Engineering Corp., Interstate Equipment Div., 18 W. Jersey St., Elizabeth, N. J.—Continuous and disposal-type aerial tramways; drives, controls and other equipment for aerial tramways.



KENNAMETAL* U-7's help pioneer continuous mining in Indiana

. . . give 40% lower bit cost at Enoco Collieries

Enoco Collieries No. 5 seam is known as a "toughie" in Indiana. Until recently this six-foot, boulder-ridden measure was considered economically impractical to mine with continuous machines due to high bit cost.

Before continuous mining was a success under these rugged conditions, many grades, types and brands of carbide tools were tested, together with modifications aimed at improving rates of penetration and bit life.

Their lowest bit cost per ton—40 percent lower than that of any other tooling used—was achieved using Kennametal U-7 Bits. These bits had a 20-degree rake angle recommended by Enoco's general superintendent, John Stachura. They increased penetration speeds in solid work up to 15 inches per minute, in recovery work up to 28 inches per minute . . . *an average of better than three inches per minute over speeds achieved with other carbide tools tested.*

A recent operating report showed an average weekly production of 365 tons, or approximately 45 tons per man at the face.

This is not an isolated case. Kennametal is increasing productivity and lowering bit cost per ton wherever it is used. The next time you buy, be sure to specify Kennametal. *It will cost you less in the long run.* KENNAMETAL, INC., Bedford, Pa.

Proper application important

The two bits shown above were originally identical. They were used in the same machine for drilling the same material . . . hard sandstone. Operating at low torque and high rpm, the bit on the right drilled four inches before it was removed. It was not reusable. Compare it with the bit on the left which drilled six feet in this material, but at high torque and low rpm. This bit is just now in need of reconditioning. The difference was in the application of the tools. Your Kennametal representative is a specialist in proper tool application. Let him help you achieve best performance.

Reconditioning—when and how

Proper bit reconditioning and changing intervals are very important, if not essential, to lowest bit cost. As a guide to setting up procedures for grinding your own tools, or judging if commercial grinding is being done properly, Kennametal offers you a comprehensive, new booklet entitled, "The When and How of Reconditioning Kennametal Bits." Write for a copy.

*Registered Trademark

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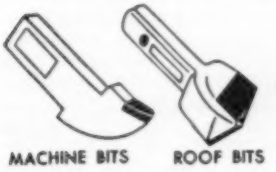
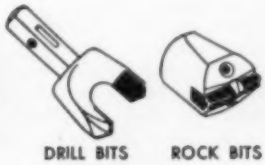
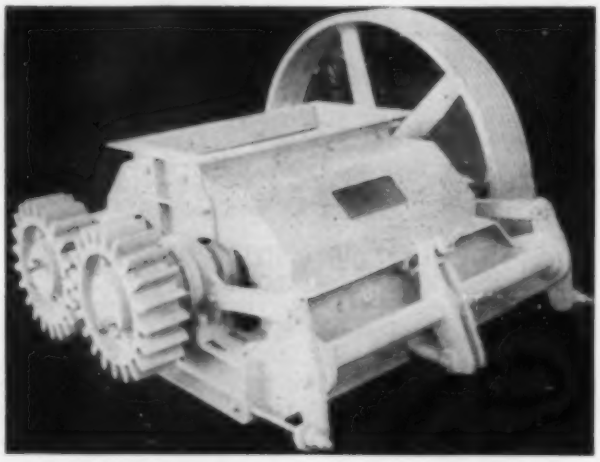


INDUSTRY AND
KENNAMETAL
. . . Partners in Progress

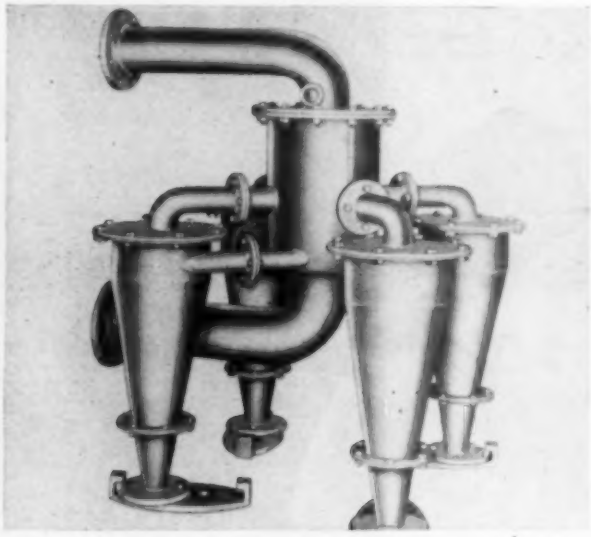


New Equipment Report . . . From p 109



Double-Roll Crusher for Accurate Sizing

The Black Diamond double-roll crusher, a relatively inexpensive unit for the reduction of coal, shown by McLanahan & Stone Corp., is available for processing a range of feed sizes, with roll diameters of 18, 24, 30 and 36 in and roll lengths from 18 to 60 in. Features cited by the maker include a movable roll that serves as a combination tramp-iron protective and adjustment device, accurate sizing of product, and special gears facilitating a wide adjustment of openings up to 3½ in. (*Coal Age*, June 1954, p 122).



Grouped Cyclones Minimize Space Needs

The CMI "Clust-R-Clone" is a compact, flexible unit in which multiple cyclones are grouped around a central manifold and made to function coordinately at maximum efficiency. The units are available in a wide range of sizes and capacities to handle any desired gallonage, and to achieve separation of any required size of solids. Design features include a removable effluent chamber; replaceable discharge cone; turret orifice nozzle plate; replaceable hardened orifice nozzle; and main cyclone body of wear-resistant alloy. Bulletin from Centrifugal & Mechanical Industries, Inc.

NEW CONTROL STOPS VIBRATING EQUIPMENT

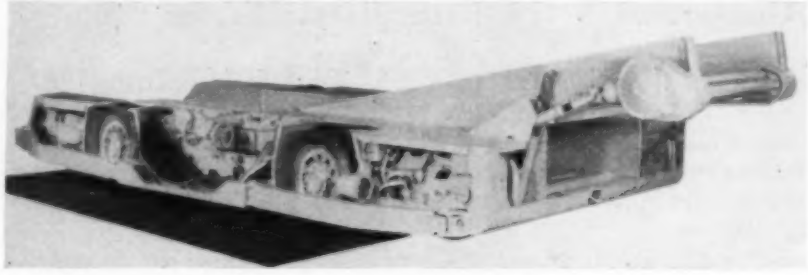
A new automatic stop control replaces mechanical snubbing with smooth electric braking for all types of vibrating equipment. Developed by Allis-Chalmers, the new unit supplies electrical energy to plug stop the motor safely without imposing high torque on either the motor or the drive. Essential parts of the control are a magnetic reversing switch, thermal relay units and pneumatic timers (*Coal Age*, January, 1955, p 102).

NEW UNIT ROLLS GROOVE IN THIN-WALLED PIPE

A new power-driven grooving tool, offered by Victaulic Co. of America, makes it possible to use the company's Snap-Joint couplings with thin-walled pipe. The groove is rolled into the pipe to provide anchorage similar to the cut-in groove in thick-walled pipe. A small hand tool for rolling such grooves soon will be available.

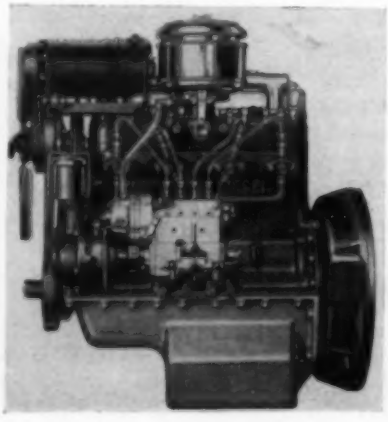
TRANSFER CONVEYOR LOADS MAIN CONVEYOR EVENLY

A new surge and transfer conveyor, developed by Irwin Foundry & Mine Car Co., provides surge capacity in a feeder unit designed to accept coal from a shuttle car and load it evenly onto a belt or other conveyor. The unit is equipped with a double-chain bottom conveyor. The body of the unit flares toward the discharge end to provide the surge capacity that permits rapid discharge.



New Shuttle Car Designed for Low Seams

Its new Type 870 cable-reel shuttle car combines a low height of 26 in with high speed and sturdy construction for "Quick-Trip Transfer of Heavy Loads," reports the Goodman Mfg. Co. The unit has an adjustable discharge and a water-level capacity of 97 cu ft. Four-wheel power steering, four-wheel brakes and four-wheel drive are standard. Other features include specially designed motors, safe electrical control, extra-strong conveyor chain and an operator's cab designed for ease of control and comfort. Bulletin 5411 from Goodman.



DIESEL ENGINE HAS USBM APPROVAL

Hercules' Model DOOD diesel engine is approved by the USBM for general underground use, the maker says, and currently is being used experimentally in a 5-ton Plymouth locomotive at the USBM experimental coal mine at Bruceton, Pa. The 4-cylinder engine has a 4¼-in bore, 4⅝-in stroke and a 255-cu in piston displacement. It has a maximum rating of 79 hp at 2,600 rpm but for underground service is operated at 1,500 rpm and 50 hp. Bulletin D-142 from Hercules Motors Corp.

Here's why CAT* DW20s strip MORE COAL AT LESS COST

Emphasis is on efficiency at this strip mine in western Pennsylvania. Each of the 3 Caterpillar DW20 Tractors on the job averages 4 round trips hourly over a ¾-mile haul. The DW20s load and haul fast — and spread evenly, thus minimizing the time and cost of backfilling. Here are some of the reasons why Cat DW20s pay off by handling more material at lower cost:

Fast cycle times. The DW20 highballs at 34.1 m.p.h. Its 275-HP (A.S.M.E.) Caterpillar Diesel Engine has power aplenty for quick acceleration and lugging ability in tough going. With a No. 20 Scraper, the DW20 can turn in a 37-foot roadway. The scraper loads with a live, boiling action, hauls 20 heaped yards and unloads even sticky materials quickly and positively.

Staying power. Construction of tractor and scraper is heavy-duty and twist-free. The Cat Diesel Engine has "Hi-Electro" hardened crankshaft, and aluminum alloy main and rod bearings for long, trouble-free work life. The scraper blade is of specially toughened steel, and controls are simple yet precise, with no complicated mechanism to get out of order.

Handling ease. Clutch and steering boosters, positive brakes with anti-jackknife device, well-grouped controls, easy routine maintenance—these are some of the reasons operators like the DW20. Comfortable operators are more efficient operators — and this means extra profits for you.

Your Caterpillar Dealer will gladly demonstrate this high-production team on your operation. Call him soon. And count on him whenever you need fast service and genuine Cat parts.

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

CATERPILLAR*

*Both Cat and Caterpillar are registered trademarks—®

NAME THE DATE... YOUR DEALER WILL DEMONSTRATE

Dorr Thickener-earthen basin team Jamison Coal and Coke Company's Hostetter, Pa. washing Plant.

Something new has been added in the coal industry . . . a Dorr Thickener-earthen basin team to recover plant water at the Hostetter, Pa. washing plant of Jamison Coal and Coke Company. First of its kind in this field, the use of the earthen basin substantially reduced installation costs compared to the least expensive conventional type of tank construction.

Quick Facts on the Installation

Equipment: 50 ft. dia. Dorr Type S Thickener installed in a 75 ft. dia. earthen basin.

Operations: 550 GPM of refuse at 8 to 10% solids is pumped into the Thickener. Underflow averaging 35% solids is filtered and discarded. Filtrate is recirculated to Thickener feed. Refuse contains fine coal clay and pyrite with 1.8% retained on 100 mesh and 13.8% on 200 mesh. 73.8% of this material passes a 325 mesh screen.

During the initial operation fine material sealed any cracks and openings in the basin and eliminated all water seepage through bottom or side walls.

Why not talk to a Dorr-Oliver Engineer on the application of this team in your plant? Just write Dorr-Oliver Incorporated, Stamford, Connecticut.

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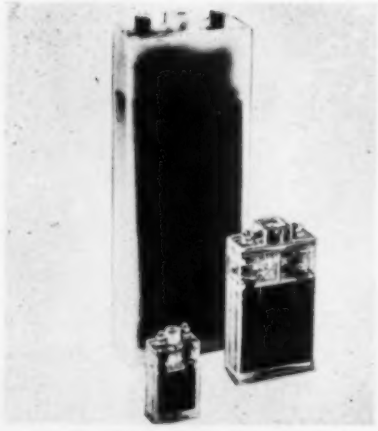


BATTERIES OFFER LONG LIFE, HIGH PERFORMANCE

Sonotone nickel-cadmium batteries, sintered-plate type, shown by National Mine Service Co., offer a number of advantages that make them applicable to mining service, such as, powering shuttle cars, locomotives and mine jeeps and for starting diesel and gasoline engines. Among the varied features cited by the maker are: small size and light weight; long life both in years and cycles of charge and discharge; high resistance to shock, vibration and weather; quick charging and easy maintenance; high discharge rates; and maximum current with minimum voltage drop. Bulletin SA-98 with full data from NMS.

AIR-POWERED DOOR REMOTELY OPERATED

Standard mine doors of the American Mine Door Co. now may be equipped with overhead compressed-air cylinders and controls to permit the doors to be operated from a distant trolley or manual contactor, as desired. All components are installed clear of the bottom, out of water and mud. Safety features include a check valve to maintain pressure in the air receiver of the door in the event line pressure falls, and sufficient capacity in the receiver itself to operate the door several times even though line pressure fails completely.

SAVING LABOR COSTS WITH AUTOMATIC CAR-LOADING

Stamler automatic loading station eliminates the need for an attendant at mine-car loading points served by a conveyor. The equipment consists of simple control elements, including a pair of "floats" and car rollers, which operate hydraulic valves to initiate the desired action from the car spotter and overhead loading chutes. The floats sense the level of coal in the cars, and their deflection by the rising coal starts the spotter which moves the car to a new position. Rollers contacting the sides of the cars operate other valves which divert the loading from one car to another and stop the conveyor when a trip is fully loaded. Employment of hydraulic pilot circuits eliminates possible delays resulting from electrical failures, the maker says.

Power at your Fingertips!

NEW O-B RAIL CLAMP HAS BUILT-IN HANDLE, CARRIES 400 AMPS WITHOUT OVERHEATING

For use on any size rail up to 100 lbs. Takes No. 14 to 2/0 cable. High strength handle is built-in. Weighs only 18½ oz.

Catalog No. 22461

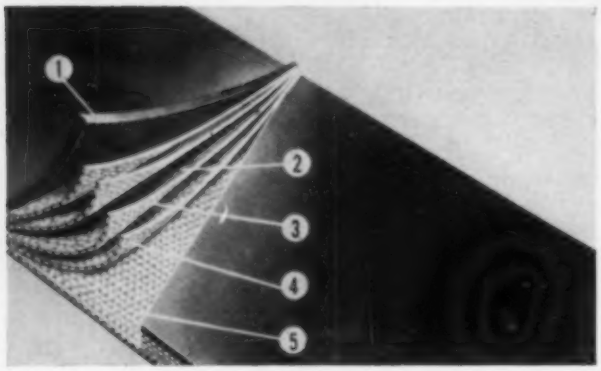
Ohio Brass

MANSFIELD OHIO, U. S. A.

IN CANADA: CANADIAN OHIO BRASS CO., LTD., NIAGARA FALLS, ONT.

Feeder and Trolley Materials • Control Materials • Trolley Shoes
Roof Bolt Shells and Plugs • Rail Bonds • Automatic Couplers

4591-M



Two New Belts for Long, High-Lift Jobs

Two new high-tension conveyor belts constructed with new synthetic fabrics, announced at the show by Boston Woven Hose & Rubber Co., are designed for heavy-duty use on long-center and high-lift installations, feature light weight with high strength and have working-tension ratings up to 110 lb per inch of ply. The "Boston High Load" belt is for extra-heavy service and the "Boston Haul King" for general heavy duty in high-tension, high-stress applications. Features illustrated include: (1) fewer and stronger plies for easier troughing and flexing; (2) synthetic fabric plies with high strength to bulk ratio for more strength per pound; (3) mildew resistance for longer life; (4) skin coating preventing fatigue failure from flexing; (5) high transverse and longitudinal strength, permitting lighter, thinner belts. Bulletin 1201-B205 from BWH.

Mine Fans Designed for High Efficiency

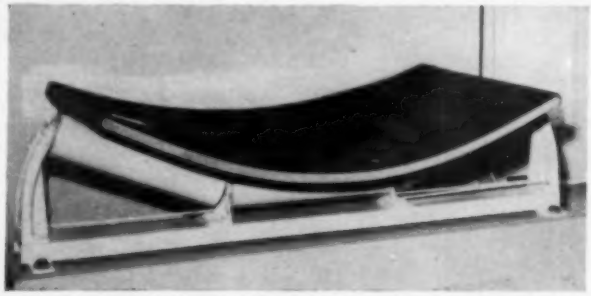
A new Jeffrey 6F Series "Aerodyne" fan is available in various sizes for mine ventilation up to 5-in water gage. Designed to combine low cost with high efficiency, the portable unit is self-contained and needs no bearing alignment after installation, the maker says. The fan features universally adjustable blades made of cast-aluminum alloy mounted on a solid aluminum hub, with flange-mounted antifriction bearings, and is available with different lengths of expansion discharge for varying duties (*Coal Age*, September, 1954, p 124).

Crawler-Mounted Shuttle Car Redesigned

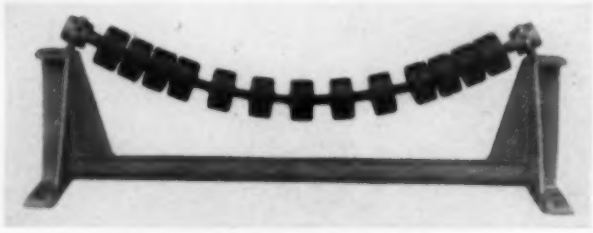
GE Type TLE-43 is the latest model of the tracklaying, cable-reel shuttle car developed by General Electric Co., for use in face transportation. The redesigned car has a capacity of 14 tons, and features new track surfaces for improved performance and easily-accessible unit assemblies for improved maintenance.

High Strength for Long Hauls in New Belt

"Super Ustex-Nylon" belt, a product of U. S. Rubber Co., will permit hauling 1,000 tph of coal on a continuous 42-in belt operating at 600 fpm over a distance of 3 mi without transfer, the maker states. A new cellulosic yarn, chemically treated

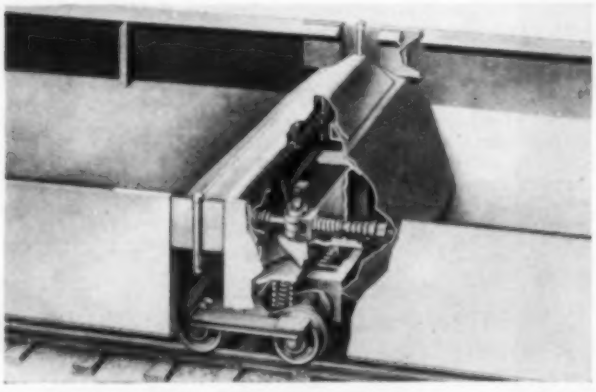


to give it exceptional strength, is three times stronger than rayon fabric and 3½ times stronger than cotton duck, the company says. Folder from U. S. Rubber (*Coal Age*, June, 1954, p 122).



Flexible 2-Bearing Idler

New Joy "Limberoller" cable-suspension idler for belt conveyors is said to provide a load-conforming catenary and cushioning of the belt, using only two bearings and carrying the belt on resilient pressure-molded discs of the same size. In continuous contact with the loaded belt, the discs exert a slight gripping action that holds slippage to a minimum and tends to keep the belt aligned. The Limberoller is slot-mounted in special bracketed stands assembled into conveyor sections without bolts or cover sheet, and brackets also are available for bolting the idler to any conventional section. The idlers are available for belt widths of 24, 30 and 36 in. Bulletin LD-103 from Joy Mfg Co.

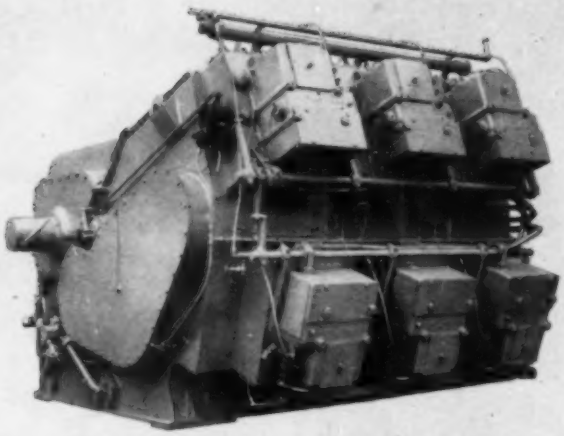


Articulated Train for Continuous Loading

Articulated design of ACF "Constant" mine train permits uninterrupted coal-handling from face to dumping point without stoppage and without spillage, the maker says. The new train consists of articulated drop-bottom cars, resembling those in the new Talgo trains in manner of suspension and type of running gear. Shorter trains have increased capacity, there are no spaces between cars, the need for wide turn-outs is eliminated and there is far less overhang on curves, reports ACF Industries, Inc.

Lower-Cost Shuttle Car Carries 6 to 8 Tons

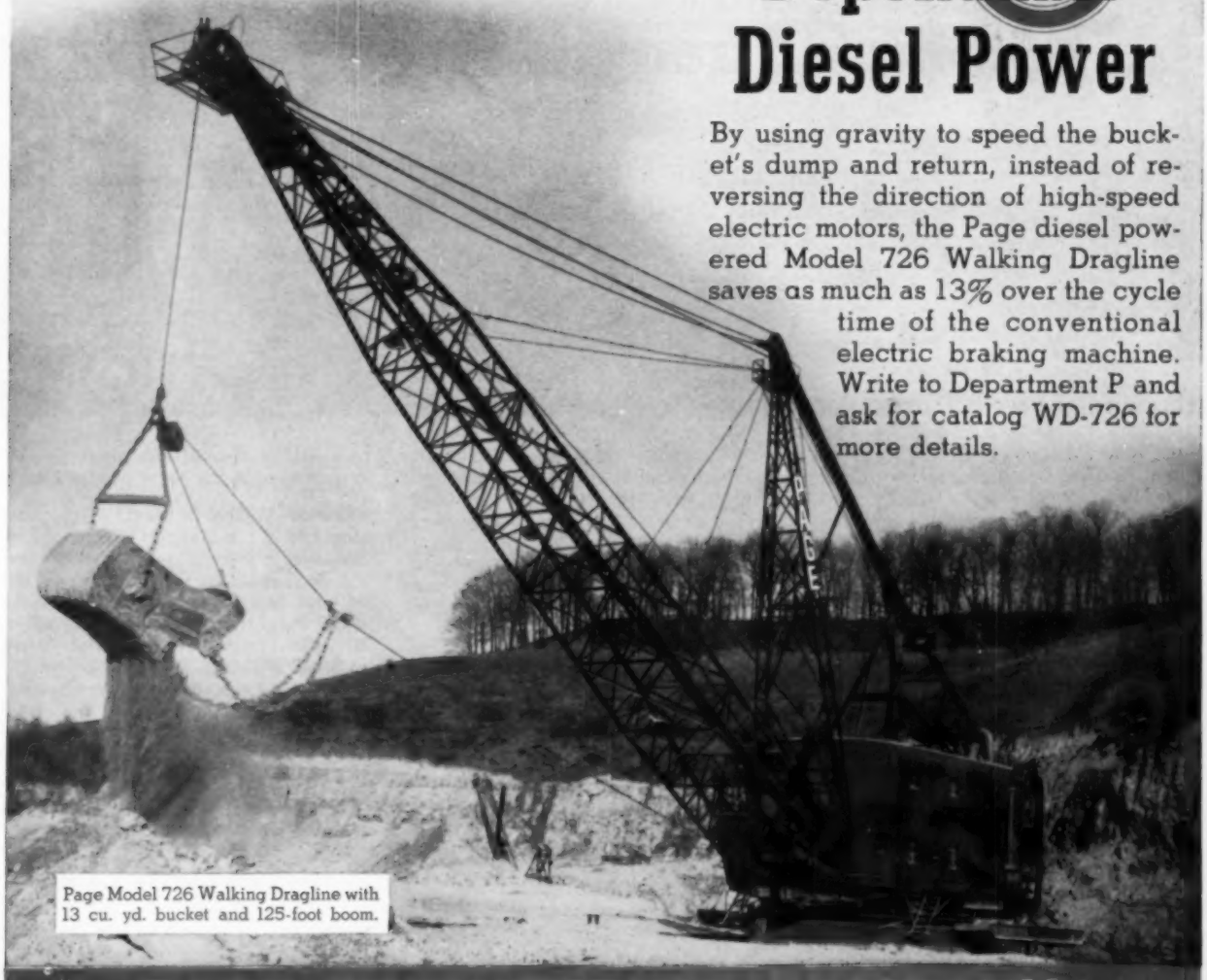
The Joy 9-SC shuttle car is a new model incorporating many of the best features of the 10-SC and is offered at a considerably lower price, according to the Joy Mfg. Co. Featuring similar heavy duty construction and design, the 9-SC offers four-



Page Engineering Company custom builds the new V-type, Horizontal Diesel Engine, shown at left, in order to allow the use of larger, more economical, draglines of capacities up to 20 cu. yds. Like the time-tested Page inline diesel, the V-type takes advantage of medium speed, parts interchangeability and complete accessibility of all moving parts to insure economy of operation and low maintenance costs.

Reduce Cycle Time with—Page Dependable Diesel Power

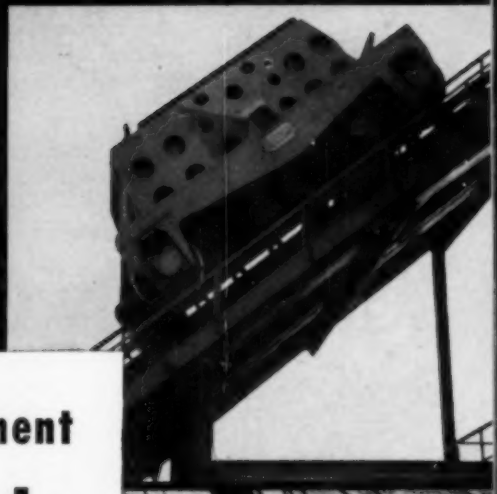
By using gravity to speed the bucket's dump and return, instead of reversing the direction of high-speed electric motors, the Page diesel powered Model 726 Walking Dragline saves as much as 13% over the cycle time of the conventional electric braking machine. Write to Department P and ask for catalog WD-726 for more details.



Page Model 726 Walking Dragline with 13 cu. yd. bucket and 125-foot boom.

· PAGE ENGINEERING COMPANY ·

CLEARING POST OFFICE CHICAGO 38, ILLINOIS



For profitable high speed mining equipment use USS High Strength Steels

USS HIGH STRENGTH STEELS can give your 'dozers, shovels, cars and draglines the strength and stamina they need to work faster and last longer—to boost production, to cut repair costs. That's because these famous steels have a 50% higher yield point, and greater resistance to wear, impact, abrasion, and fatigue than carbon steel.

USS TRI-TEN STEEL gives you high strength plus high resistance to impact at low temperatures. This tough, versatile steel is ideal for use in heavy-duty equipment which must operate in subzero weather. For it retains its toughness and withstands shock under low temperature conditions. Will keep your shovels, draglines and 'dozers going when others fail.

USS COR-TEN STEEL gives you high strength plus high resistance to corrosion. This high strength steel has 4 to 6 times the resistance to atmospheric corrosion of structural carbon steel. This property helps to assure long life and low maintenance cost in mine cars and similar equipment that must operate under corrosive conditions.

USS MAN-TEN STEEL gives you high strength plus resistance to abrasion. This lower-cost grade has a higher resistance to abrasion than carbon steel. In addition to high strength and toughness, it has workability and weldability to a higher degree than obtainable in carbon steel at the same strength level.

USS HIGH STRENGTH STEELS can be used singly or in combination to replace carbon steel in the vital parts of your mining equipment to increase service life without increasing dead weight. And, if the use of thinner sections is possible, they can (1) reduce equipment weight without reducing its strength, or (2) increase the size and capacity of equipment without increasing the total weight or the power needed to move it.

For more information call or write our nearest office.

NOW AVAILABLE—Our new "Design Manual for High Strength Steels" is ready for distribution. This excellent book contains comprehensive and practical information that you will find extremely useful in designing your product for greater economy and efficiency by the sound use of high strength steels.

For your free copy, write on your company letterhead giving your title or department. United States Steel Corporation, Room 4758, 525 William Penn Place, Pittsburgh 30, Pa.

UNITED STATES STEEL CORPORATION, PITTSBURGH • AMERICAN STEEL & WIRE DIVISION, CLEVELAND • COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO
NATIONAL TUBE DIVISION, PITTSBURGH • TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA. • UNITED STATES STEEL SUPPLY DIVISION, WAREHOUSE DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

USS HIGH STRENGTH STEELS

USS

UNITED STATES STEEL

wheel drive and power steering, hydraulic disc brakes and two 10-hp traction motors as standard. It has a maximum width of 7 ft 8 in, is available in two basic heights, 43½ and 49½ in, handling a payload of from 6 to 8 tons. Maximum level traveling speed is 3.6 mph, loaded, and 4.3 mph, empty, with complete conveyor discharge in 45 sec.

BATTERY HAS LONGER LIFE AND IMPROVED CAPACITY

Longer working life and 20% more capacity with no increase in space required are claimed by the Electric Storage Battery Co. for its TH Exide-Ironclad shuttle-car batteries with the new "Silvium" grid alloy. Slotted tubes of polyethylene keep the active material in constant contact with the grid spines, yet permit free penetration of the electrolyte through the active material. An added feature is the acidproof polyethylene tube sealer fitted to the bottom of the positive plate, which seals in the active material and maintains higher battery capacity for a longer working life, the maker says. Grids contain corrosion-resistant Silvium, which is a silver-lead alloy developed by Exide engineers after many years of research and patented early in 1954. Nearly indestructible microporous separators, homogenized sealing compound, and seamless rubber jars are other new features that the maker says contribute to better battery performance.

STRONGER CONVEYOR BELT CARRIES LONGER DISTANCES

"Super Raynile" was developed by Hewitt-Robins for hauling capacity tonnages of coal, ore, rock and gravel to greater heights and over longer distances. The greater strength was gained without any additional stiffness. The belt is lighter then duck and rubber belting of the same strength, is more resilient than steel-reinforced belt, is easier to install and more economical to maintain, it is said. In one flight over level terrain, the belt can haul 400 tph on a 6-ply 30-in belt for 6 mi; the same belt could lift material from ground level to a height of 850 ft, the maker reports. The new belt is available in widths up to 72 in and thicknesses up to 15 plies. Bulletin H-21 from Hewitt-Robins.

PANGBORN DUST CONTROL GIVES YOU

"TIPPLE-TOP" SAVINGS

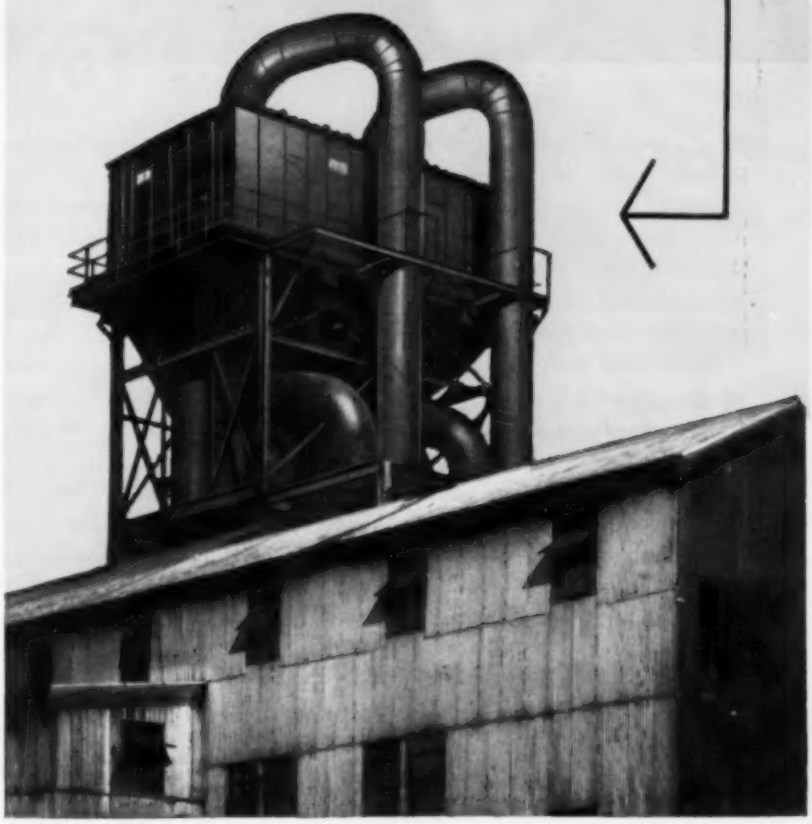
"Tipple-top" savings is our way of saying that a Pangborn Dust Collector will save you money. Uncontrolled coal dust can be expensive. Pangborn Dust Control cuts costs by trapping dust at the source—pays for itself by improving dust reclamation, increasing the life of valuable machinery, lowering plant maintenance costs, stepping up production by keeping employee health and morale high.

Let Pangborn engineers conduct a free dust survey in your plant to determine how Pangborn Dust Control can save *you* money. There's no obligation.

For additional information, send for free copy of "Out of the Realm of Dust." Write to: PANGBORN CORP., 2800 Pangborn Blvd., Hagerstown, Md. *Manufacturers of Dust Control and Blast Cleaning Equipment.*

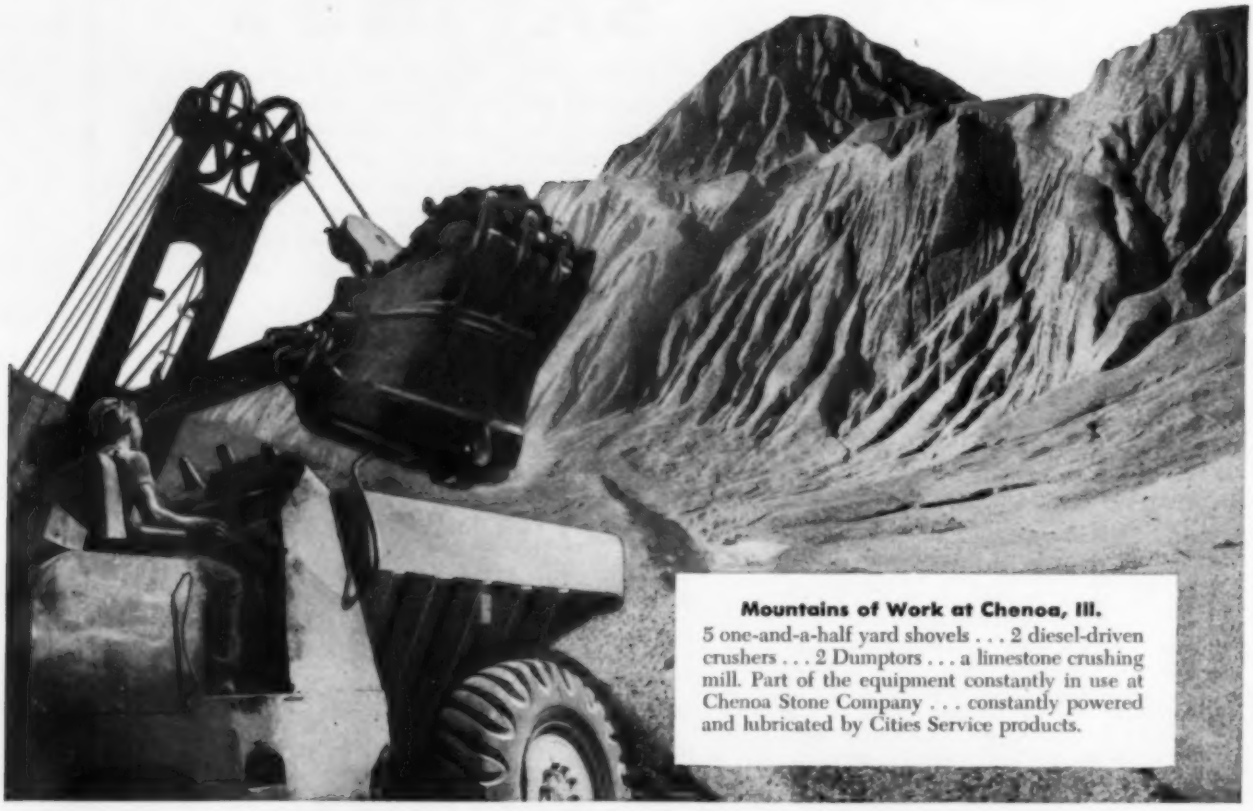
Pangborn

CONTROLS DUST



Cities Service C-300 cuts make-up oil 600%!

Stone cold facts from the
Chenoa Stone Company, Chenoa, Illinois



Mountains of Work at Chenoa, Ill.
5 one-and-a-half yard shovels . . . 2 diesel-driven crushers . . . 2 Dumptors . . . a limestone crushing mill. Part of the equipment constantly in use at Chenoa Stone Company . . . constantly powered and lubricated by Cities Service products.

Here's the story in the words of David D. Vickrey, Superintendent of Chenoa Stone Company:

"About two years ago, we switched from another nationally prominent brand oil to Cities Service C-300 Series Motor Oil. The results have been amazing.

"C-300's detergent action completely eliminated a bothersome sludge problem. On our first three oil changes with it, we removed 5 gallons of sludge from each of our 200 horsepower diesels. Since then, these diesels have remained clean, and today, when we open the crankcase, we can even see the paint.

"We also are using far less oil between changes. In fact Cities Service C-300 actually cut make-up oil from 5 to 6 gallons every 150 hours to less than one gallon every 150 hours!

"In addition to C-300 oil, we use Cities Service Lubricants for every requirement... Diesel Fuel, Gasolenes, Trojan M Grease and hydraulic fluid. We have been completely satisfied with every product.

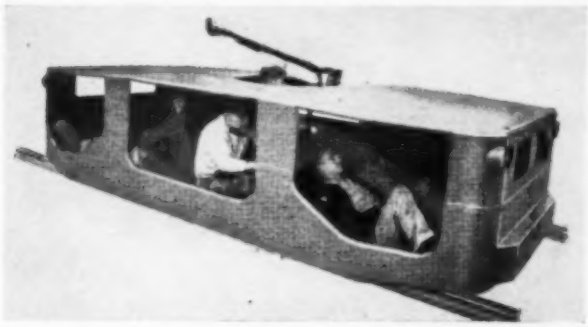
"Cities Service has given us top-notch service, the best we've ever had. We are better supplied than ever and have learned to rely on Cities Service dependability."

There is nothing Cities Service could possibly add to Mr. Vickrey's statement, except a reminder to contact your local Cities Service representative in order that you may enjoy similar results in *your* operation. Or write: Cities Service Oil Company, Sixty Wall Tower, New York 5, N. Y.

CITIES SERVICE

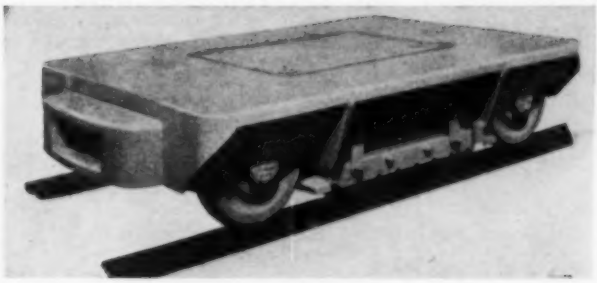
QUALITY PETROLEUM PRODUCTS

Equipment Show Report . . . Begins on p 92



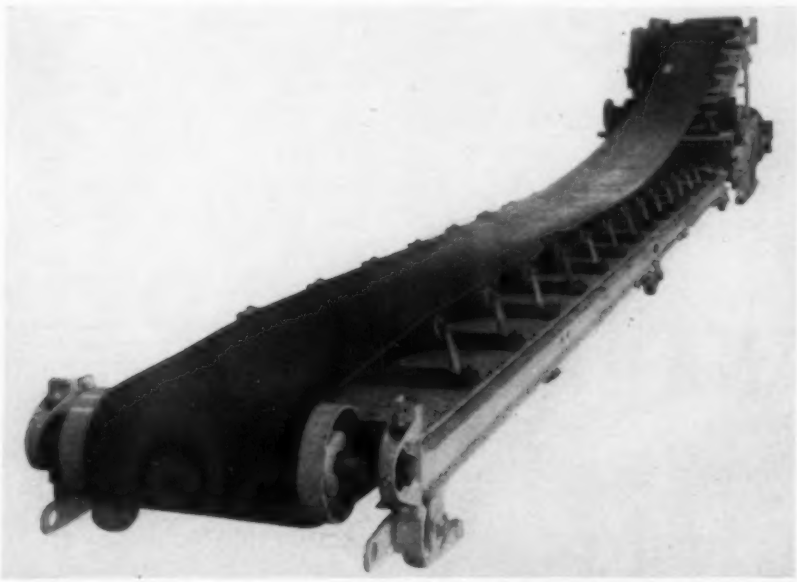
Self-Propelled Unit Hauls Production Crews

The "Mine Portal Bus," shown by the Lee-Norse Co., is designed to speed the handling of production crews, thereby reducing portal to portal time. Available either with a split-roof design or without a roof, the unit can carry 12 men at a speed of 12 mph. The split-roof design is said to permit the operator an unobstructed view in all directions and put him in position where he can safely handle the trolley pole.



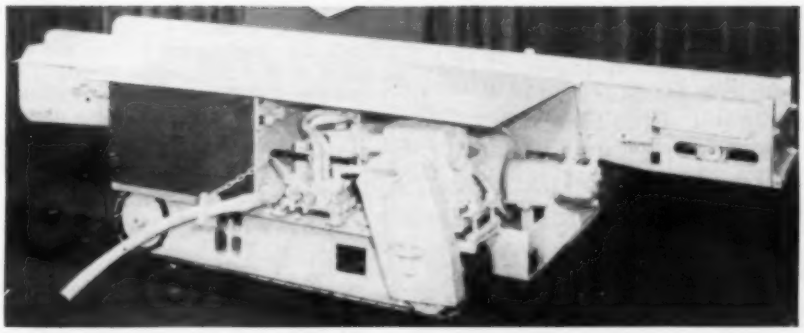
Special Car Provides Braking Power

Sanford-Day Brakeman Car, incorporating electrically-operated magnetic shoe brakes, eliminates the need for skids or for costly spare locomotives for extra braking power. It may be used between locomotives, between locomotives and cars, between cars, or at the end of a trip, with controls in the operator's cab. The car may be equipped with 2, 4 or 6 brake shoes each containing a sealed magnetic coil. The coils are actuated by direct current from a set of batteries within the car. The batteries may be charged by an m-g set within the car taking current from a trolley, by a charging set geared to a wheel hub, or at a charging station. Full details from Sanford-Day Iron Works.



Conveyor Designed to Serve Continuous Miner

A modified new design of the "Mineaveyor" designed to serve a continuous miner was shown by Hewitt-Robins. The shuttle-type of belt conveyor has articulated intermediate deck sections and an adjustable fixed tripper, the maker says. The unit uses a minimum belt width of 24 in and handles up to 250 tph. Available in lengths up to 750 ft, the belt was developed primarily for economical transportation of coal produced by the present-day types of continuous-mining equipment. (Photo at left.)



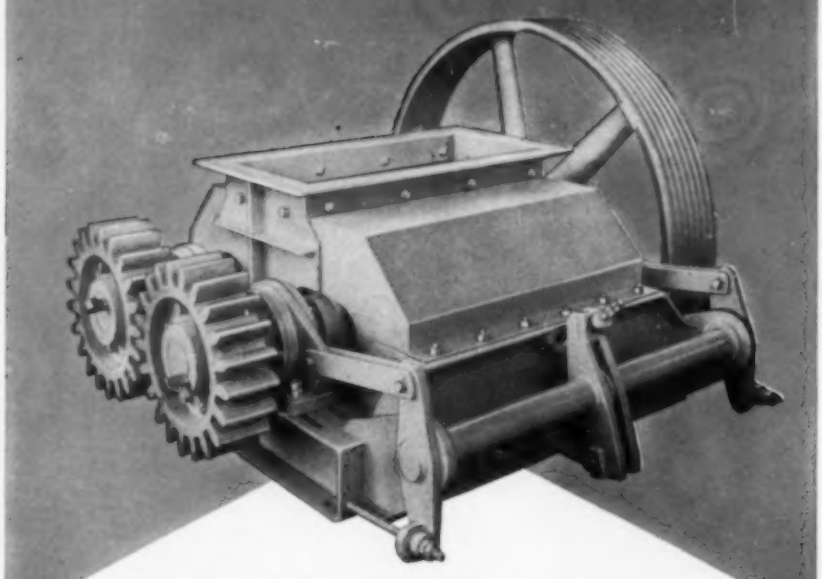
Self-Tramming Conveyor for Continuous Mining

The new Long crawler-mounted self-tramming conveyor drive is quickly moved from place to place by one man, using for tramming a simple hydraulic system driven by the conveyor motor itself without additional electrical parts. The M-500G conveyor, specially designed for continuous mining, is driven by a 25 to 40-hp motor capable of heavy-duty continuous service. Standard capacity is 5 tpm. Operating lengths range up to 500 ft, depending on load and grade. Bulletin 4007 from The Long Co.

SOLIDS PUMP UTILIZES NEW OPERATING PRINCIPLE

Pumping anything from live fish to ready-mixed concrete has proved possible in test installations of its completely new type of pump, according to Western Machinery Co. Available in sizes from 2 to 10 in, for pumping a wide range of abrasive, waste and other materials, the new Wemco "Torque-Flow" solids pump operates on a completely unique materials-moving principle, the maker points out. Its impeller is similar to an automobile fluid drive, and although entirely out of the material flow pattern, it induces a vortex that does the pumping. Bulletin SP-10 from Western Machinery (*Coal Age*, January, 1955, p 98).

For low-cost crushing
of COAL—LIME—
CINDERS—and similar materials



the McLANAHAN

Black Diamond

DOUBLE ROLL CRUSHER

Designed as a relatively inexpensive yet sturdy crusher for accurate sizing of the crushed product, the McLanahan Black Diamond Double Roll Crusher is available in 18", 24", 30" and 36" diameter rolls with roll widths from 18" to 60" for handling various feed sizes and capacities. Cast steel or semi-steel gears with extra long teeth provide adjustments in crusher opening. Anti-friction bearings.

Write today for Bulletin BDDR-255

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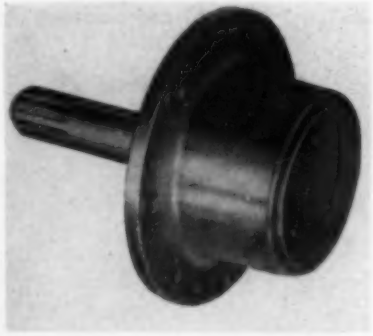
250 Wall Street, Hollidaysburg, Pennsylvania



SHUTTLE-CAR WHEEL UNIT CUTS REPAIR COSTS

The Lee-Norse "Drive Wheel Friction" unit is designed to reduce high maintenance costs on 5-SC and 6-SC shuttle cars resulting from breakage and damage to the wheel units and parts, such as, gearing, bearings, universal drive shafts, etc., by limiting the loads and shocks of these wheel-drive parts to what they can take without breaking, while still delivering maximum power to each wheel, the company reports. Quickly and easily installed, the new method of driving through a multiple-disk friction which is always engaged and held together by a predetermined spring pressure limits the torque that can be delivered to each wheel (*Coal Age*, October, 1954, p 124)

HYDRAULIC CAR SPOTTER FOR SHUTTLE-CAR SECTIONS

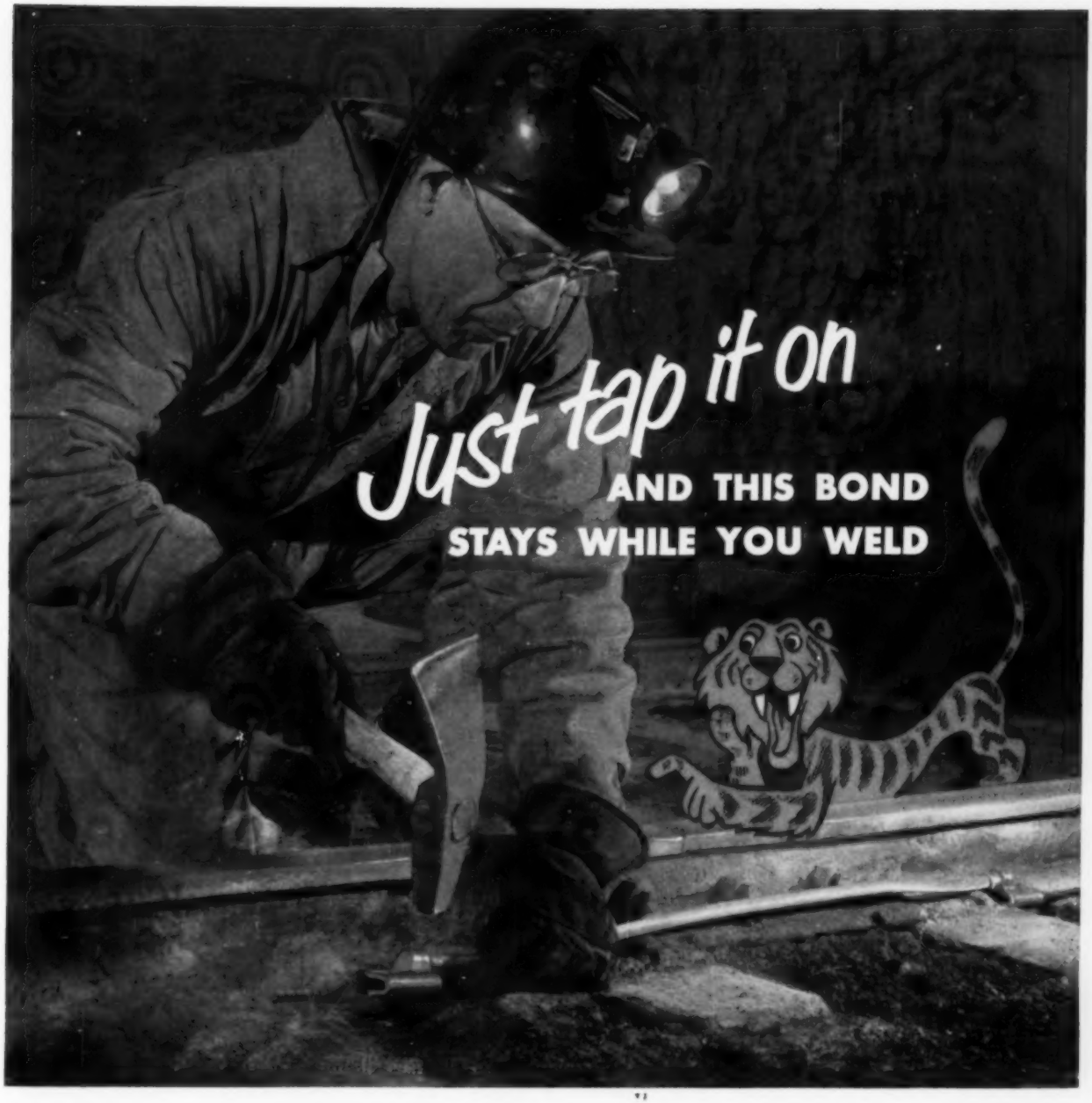
"Shortie" car spotter, made by the W. R. Stamler Co., is a medium-duty unit only 6 ft longer than the car to be handled. The Shortie was developed particularly for shuttle-car sections where its small size facilitates frequent moves. It is rated at 15,000-lb DBP at speeds up to 40 fpm. Height of the unit is only 5 in, providing ample clearance for mine cars when used with the light rails commonly found at loading points.

NEW TOUGH, LIGHTWEIGHT VENTILATION TUBING

"Neolon Tubing" is flexible ventilation tubing made of a combination of neoprene and specially-woven nylon fabric designed especially for its intended service. A product of American Brattice Cloth Co., the new tubing is easily installed by hanging it from a support cable or other hanger. A section of Neolon 100 ft long and 12 in in diameter weighs 40 lb.

AUTOMATIC LOADING POINT REQUIRES NO LABOR

Supplementary equipment along with the Nolan Porta-Feeder provides an automatic loading station suitable for use with belt or chain conveyors or with elevating conveyors. Motions of the loading station are actuated by means of a loading bar which senses the height of the coal pile in the car and operates the Porta-Feeder accordingly, and by car probes which control car changes. The system may be equipped with a fly gate or with a short reversible chain conveyor for car changes.



You don't need special holding devices to install a Tigerweld BF-10 Rail Bond. Just hammer it on the track base; it clamps on and stays in position while you weld it.

This bond is reversible. You can put it on top of the rail base. Or you can flop it so that the strand is under the rail base where it will be better protected from dragging equipment.

Tough steel terminals, flash butt welded to a rugged strand, make this bond durable. It can be reclaimed and used again.

Write for complete information.

AMERICAN STEEL & WIRE DIVISION, UNITED STATES STEEL CORPORATION
GENERAL OFFICES: CLEVELAND, OHIO

COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO, PACIFIC COAST DISTRIBUTORS • TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA., SOUTHERN DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

USS American Tigerweld Rail Bonds

USS

UNITED STATES STEEL

OSMOSE

TREATED TIES AND TIMBERS CAN SAVE YOU

25¢ per ton

Here's how! 30% to 50% of your supply bill is for TIMBER and TIMBER REPLACEMENT. Osmose scientifically-treated Mine Ties and Timbers can cut this expenditure to the bone simply because they LAST 3 to 5 TIMES LONGER.

Mine ties and timbers don't just "rot" or "decay" in the sense that these two popular words might convey. Actually, they are "eaten up" by microscopic organisms that feed on the wood fibers. Osmose is poison to these micro-organisms, which die or look elsewhere for their food.

Proof of the fact that this 25c per ton saving is possible can be yours by directing an enquiry to any of a long list of famous mines that SAVE thousands of dollars per year with Osmose Treated Ties or Timbers. For instance, in 1954 the Island Creek Coal Co. said: "We have been using Osmose Timbers in our mines since 1942 . . . We are pleased with the results."

You'll be more than "well pleased" when Osmose Treated Ties or Timbers start saving YOU up to 25c per ton. Let us send you complete details NOW.

SEND FOR FREE BOOK
Colorful, completely illustrated booklet, gives you all the facts. Write for it.

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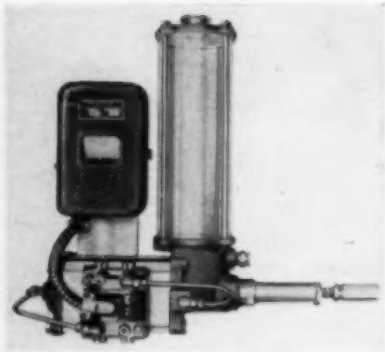
980 ELLICOTT STREET • BUFFALO 9, NEW YORK
Representatives in: Pittsburgh, Denver, Birmingham, Ala., Charleston, W. Va. and Harlan, Ky.
"Leading Manufacturers of Wood Treating Specialties"



DIFFERENTIAL TIMING IN CENTRALIZED LUBRICATION

Lincoln Engineering Co.'s new air-operated centralized lubrication system is designed to service machines operating at varying rates of speed where application of lubricants at varying intervals may be required. The machines may be interchanged without disturbing the lubrication system, which may be controlled electrically, mechanically or manually (*Coal Age*, January, 1955, p 104). Bulletin 806 from Lincoln Engineering.

NEW-TYPE POWER DRIVE

Featured by Manhattan Rubber Div., Raybestos-Manhattan, Inc., as a new concept of power transmission, the "Poly-V Drive" is a single, endless rubber belt with series of parallel V-ribs molded lengthwise around the inside, and an uninterrupted high-strength member of synthetic cords across its entire width. It is said to provide twice the contact area of comparable multiple V-belt applications and up to 50% greater horsepower with the same width or equal horsepower with one-third less sheave width, as well as eliminating belt-matching problems common to multiple V-belts and offering economy in belt and sheave inventories (*Coal Age*, June 1954, p 124).

NEW FIREHOSES IN COLOR, NEW MATERIALS

New Qua-Flex is a red-colored firehose designed for interior installation in keeping with accepted color standards by the Quaker Rubber Co., Div. of H. K. Porter Co. Another new firehose, Petrochem, is made of a neoprene tube inside a 100% Dacron jacket with neoprene coating, and is primarily for use in corrosive conditions.

FACING A TOUGH PROPOSITION?

you can beat it with **JALLOY**

JALLOY HEAT-TREATED STEEL PLATE BEATS WEAR DUE TO IMPACT AND ABRASION

Jalloy Plates outlast other steels by margins of 4 to 1

Jalloy Aprons in Tyrock screen last 3 times as long as other steels

Jalloy lowers maintenance costs on ore and coal conveyors

Jalloy provides longer wear with less repair in truck bodies

Jalloy Heat-Treated Plate is the special purpose steel that is heat treated to provide longer wear on applications where impact and abrasive conditions are severe.

In comparison with other abrasion-resistant steels as well as mild steels, it gives optimum results when heat treated, to a Brinell hardness of 340 and up. Jalloy permits savings in steel costs, maintenance, and repair. Furthermore, it is easily welded. Jalloy is available in three grades—1, 2, and 3 to meet various service requirements.

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Jones & Laughlin STEEL CORPORATION — Pittsburgh

Complete data concerning CHEMICAL COMPOSITION . . . HEAT TREATMENT . . . WELDABILITY . . . PHYSICAL PROPERTIES . . . will be mailed to you promptly. Write today.

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America's most complete line of CRUSHING EQUIPMENT

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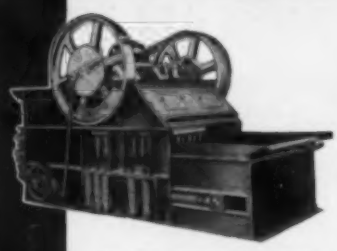
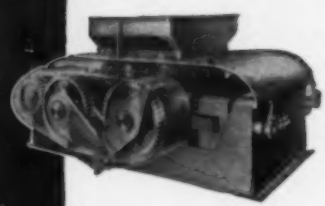


McNally Norton Vertical Pick Breaker

50% less fines when reducing lump to egg and stove sizes.



McNally Double Roll Gearmatic R. O. M. Breaker

Built in tonnage ranges from 750 tph to 1400 tph. Full floating Gearmatic drive.

McNally Gearmatic Stoker Coal Crusher

This unit offers three prime advantages:
High volume production, plus accurate sizing, plus low percentage of fines.

McNally Single Roll Crusher

Universal application. 20", 24" and 36" dia. rolls.

For immediate action on complete information write, wire or call . . .

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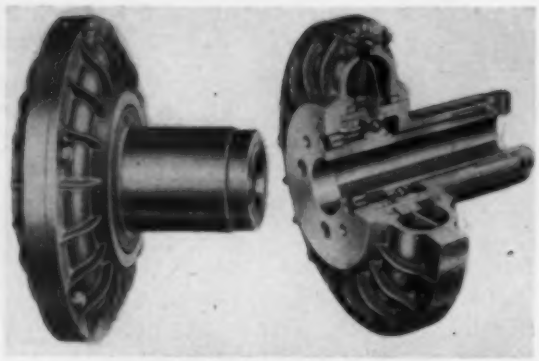
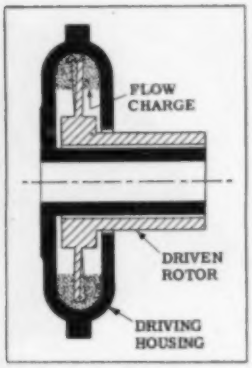
★ Wellston, Ohio ★



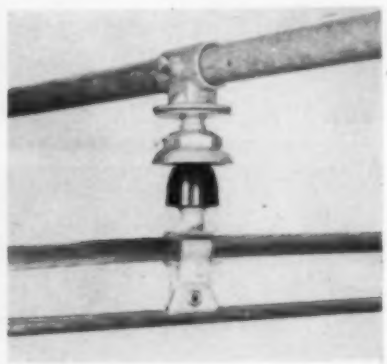


"Dry" Fluid-Drive Handles Difficult Starts; Air Clutch Features Ease of Control, Sensitivity

"Flexidyne," a new drive unit (illustrated) offered by Dodge Mfg. Corp., consists of a housing and internal rotor with steel shot acting as the power-transmitting fluid. The unit is said to have wide application for drives involving heavy-inertia and shock loads (*Coal Age*, April, 1955, p 106).

The Dodge "Air-Grip" clutch is a quick-response, easily-controlled, sensitive unit which permits partial or full engagement as required. Provision is made for mechanical engagement in the event air-supply fails (*Coal Age*, December, 1954, p 112A). Bulletin A-634B from Dodge.

Also featured by Dodge was the latest addition to its line of "Torque-Arm" speed reducers, the No. 8 double-reduction unit with a 60-hp capacity offering—an increase of almost 40% in capacity over the largest previous unit. Bulletin A-637.



New Aids To Better Power Distribution

New lightweight rail clamp, above, shown by Ohio Brass Co., carries up to 400 amp continuously without overheating, may be attached to any rail up to 100 lb per yd, handles cables in sizes from No. 14 to 2/0 and features a permanently-attached handle for setting and releasing (*Coal Age*, April, 1955, p 108). Other Ohio Brass innovations presented at the American Mining Congress Coal Show include an "O-B Circuit Interrupter" containing control elements capable of distinguishing between simple overloads and actual faults for the protection of personnel and the prevention of cable and machine damage from short circuits. Also offered was the "O-B Quick-Break" section insulator switch, a 1,500-amp switch with smooth underrun for sectionalizing trolley and feeder. A new trolley-feeder clamp, above right, opens up to provide a sling to hold feeder cable during stringing operations. The feeder may be installed before, after or simultaneously with the installation of the trolley wire.

PRESERVATIVE PROTECTS SEASONED WOOD

New "Pentox" wood preservative for seasoned wood was shown by the Osmose Wood Preserving Co. of America, Inc. The water-repellent pentachlorophenol preservative contains "Rosen Amine D" and is formulated for treatment of seasoned wood for the prevention of attack by fungus and wood-boring insects, such as, lyctus beetles, ants and termites. The preservative is best used by submerging the entire piece of wood in the treating solution or spraying large surfaces, the maker says.

SWAGING UNIT ATTACHES HYDRAULIC FITTINGS

A swaging process and equipment for doing the work of making factory-type hydraulic-hose connections is offered by the Weatherhead Co., for use in mine shops at prices of approximately $850 for a hand-operated unit or $1,500 for an automatic unit. The equipment eliminates the need for hand operations in squaring up the hose ends and hand skiving, and reduces the cost of making the assembly by about 25%, the company says.

GENERAL CABLE

THE GREATEST NAME IN ELECTRICAL WIRE AND CABLE

Every type in the completely new line of SUPER SERVICE resists impact, crushing and cutting far beyond accepted field requirements. Special cord reinforcement provides vital extra tensile strength and increases wear. SUPER SERVICE needs less replacement.

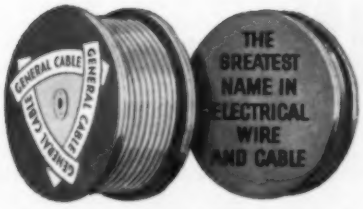
LOOK AT THESE FEATURES:

SUPERTUF — General Cable's new mold cured jacket — is free from ply separation, resists tearing and abrasion. New, more compact design prevents sleeving of the jacket from the core. Flame resistance far exceeds requirements of the Federal Bureau of Mines. New SUPER SERVICE meets all IPCEA Specifications.

THERMAX heat resistant insulation, another SUPER SERVICE improvement, provides top protection against temporary current overloads and extends the operating life of the cable.

Result: a well balanced product that performs better and lasts longer. Why settle for less! Remember — General Cable is the only manufacturer able to fill *all* your wire and cable needs. It pays to buy in one place!

GENERAL CABLE
CORPORATION



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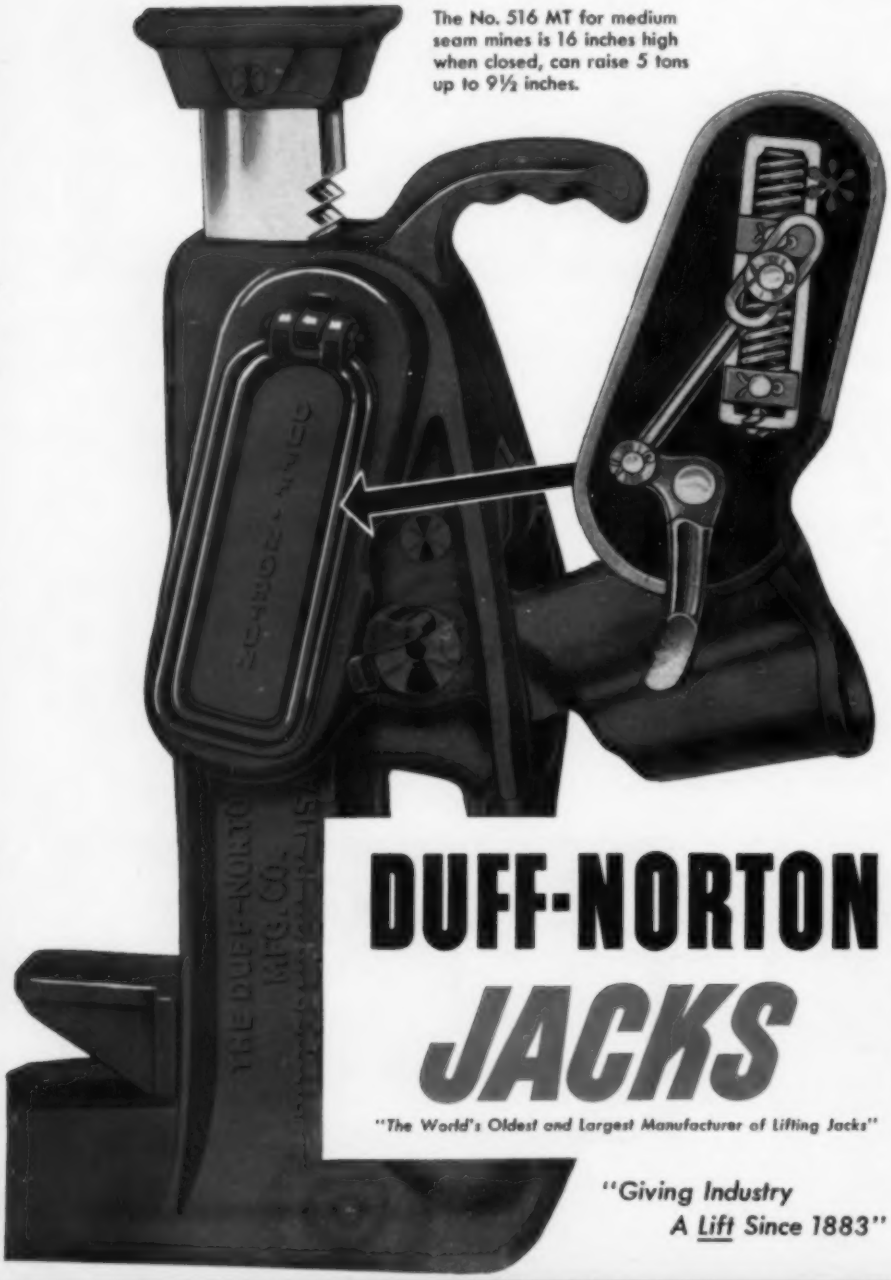
Why This Special Mine Jack Will Give Longer, Trouble-Free Service

When Duff-Norton engineers set out to design safer, longer lasting jacks for men who work in and around coal mines, they discovered one startling fact—about 90% of jack maintenance was in replacing worn springs in the mechanism that controls the jack's raising or lowering action. Result? All Duff-Norton mining jacks are equipped with a patented,* adjustable spring mechanism which assures positive engagement of rack teeth. The spring's tension can be easily adjusted with a screw driver without removing any part of the jack. Should the spring eventually lose its resiliency, there's no need to send the jack to the repair shop. A new, complete spring mechanism assembly can be quickly installed by anyone in a matter of minutes, making the jack as good as new! In fact, as a special service, Duff-Norton distributors carry in stock extra spring mechanisms for all Duff-Norton ratchet lowering jacks.

Ask your local distributor or write the world's oldest and largest manufacturer of lifting jacks for a copy of *"A Handy Guide for Selecting Duff-Norton Mine Jacks."* This colorful, illustrated booklet is full of useful information about all kinds of jacks for coal men. Write for bulletin AD10-J to Duff-Norton Company, P.O. Box 1889, Pittsburgh 30, Pa.

The No. 516 MT for medium seam mines is 16 inches high when closed, can raise 5 tons up to 9½ inches.



DUFF-NORTON

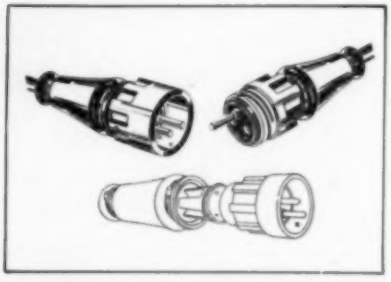
JACKS

"The World's Oldest and Largest Manufacturer of Lifting Jacks"

"Giving Industry A Lift Since 1883"

FOUR FEATURES IN NEW SHUTTLE-CAR CABLE

"Securityflex," a new twin-parallel shuttle-car cable produced by Anaconda Wire & Cable, comes with new insulation, new stranding, new breaker strip and a reinforced jacket for longer, safer, more-economical service. The new neoprene insulating compound is said to increase resistance to puncture, flame and crushing. Improved stranding of power and grounding conductors prevents broken wires, and a nylon breaker strip increases short-circuit protection, the maker states.

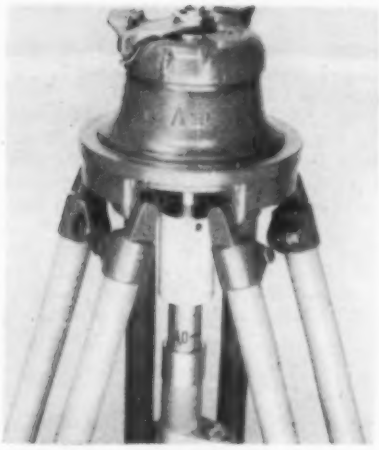


NEW CONNECTORS SPEED CABLE SECTIONALIZING

New Joy line of attachable electrical plugs and receptacles for mining requirements are called the "Quick-Loc" series because a three-quarter turn couples or uncouples them (*Coal Age*, February, 1955(p 106). Easily attached to cable, the new connectors are available for AC or DC applications from 35- to 450-amp ratings (No. 8 through 750 MCM, AWG). Plugs consist of two parts: the connector head, containing contacts and wiring terminals; and a protective neoprene sleeve that fits over the cable-connector juncture. Bulletin B57 from Joy Mfg. Co.

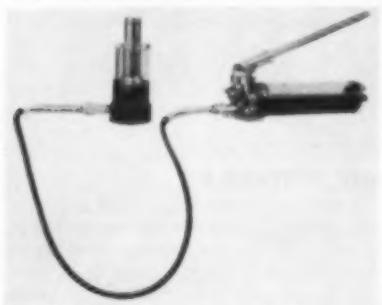
SMALLER-SIZE STEEL FLAME SAFETY LAMP

The "National" Model Koehler flame safety lamp now is available in a steel construction in the small size that has formerly been offered only in aluminum, reports National Mine Service Co. The lamp measures only 8¾ in high and weighs 3 lb 1 oz in the steel construction, 1 lb 12¾ oz in aluminum. Bulletin 533 from NMS.



CENTERING TRIPOD, NEW SURVEYING INSTRUMENTS

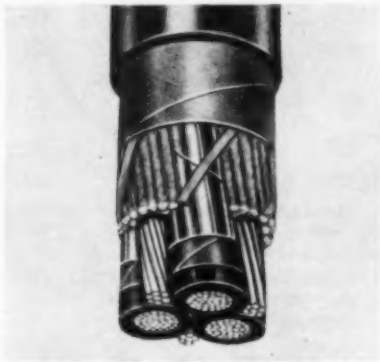
A metal-leg centering tripod (illustrated) that simply establishes a level plane for manipulation of the instrument regardless of the tripod position was one of the new Swiss-made surveying instruments shown by Kern Instruments, Inc. The centering tripod simultaneously centers the instrument over the station point, roughly levels the top of the tripod head and indicates height of the instrument. Other new instruments shown included the "Kern Planetable Alidade" with self-reducing, erecting telescope, and new-type parallel plotter; and the "Kern Special Optical Plummet" developed for the U. S. Corps of Engineers for "plumbing" of vertical shafts and structural members.



SPECIAL HYDRAULIC JACKS AND PULLERS EASE WORK

The Simplex "Re-Mo-Trol" remotely controlled hydraulic puller, available in capacities from 10 to 100 tons, may be used for both pulling and pushing. Because it can be remotely controlled work men can operate it from a safe location. A center-hole construction extends the application of the puller to pulling axles, shafts, etc., because a connecting rod can be attached to the object to be pulled and the rod drawn through the center of the "Re-Mo-Trol," the maker, Templeton, Kenly & Co., says.

The Simplex "Rol-Toe" hydraulic lifting jack has a lifting capacity on the toe identical to that on the cap. Lifting operation is said to be smoother and easier because the 4⅝x4⅛-in toe always remains in an even position. Model RTJ-25 has a 25-ton capacity and a 7-in lift, with minimum heights of 2⅝-in when lifting on the toe and 14 in when lifting on the cap. Models ranging from 10- to 50-ton capacity are available. The Rol-Toe has two separate pumps, a high-speed unit for positioning and lifting lighter loads, and a high-pressure pump for heavy lifting. A safety bypass valve prevents overloading.



NEW 5,000-V POWER CABLE FOR MINE FEEDER SERVICE

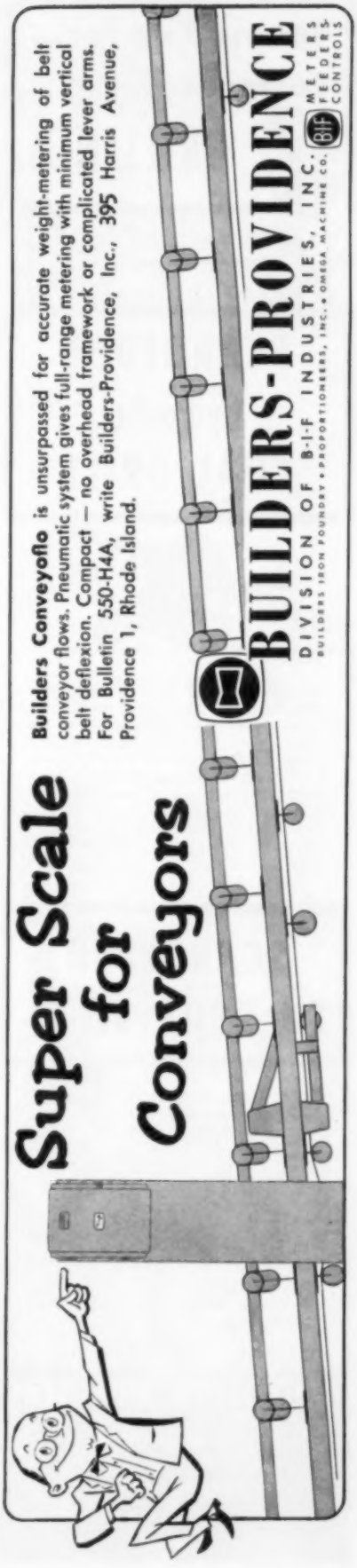
A new type of non-metallic sheathed cable designed especially for 5,000-v feeder service was shown by Rome Cable Corp. Lower installation costs are possible, the company says, since the cable is made lighter in weight and smaller in diameter than others of similar capacity through the use of polyethylene insulating compounds and a polyvinyl-chloride sheath. These compounds also provide greater resistance to chemical attack, mechanical damage and so on. The cable is suitable for installation in boreholes and shafts and in horizontal runs underground or in suspension, the maker says (see *Coal Age*, November, 1954, p. 121.)

PRE-FORMED NEOPRENE ADDS TO CABLE LIFE

"Red Saddle," a new feature of Hazacord twin-parallel shuttle-car cable, is a bright-red, preformed neoprene protective wall assuring a uniformly thick fill between power conductors, providing increased security against short circuits resulting from run-overs by heavy equipment and locking the hexagonal-jacketed conductors in place to prevent internal slippage. A round ground conductor is carried in the red saddle for greater flexibility in the cable and reduced breakage in the ground conductor. Full details from Hazard Insulated Wire Works, Div. of the Okonite Co. Also shown was a flat 3-conductor trailing cable for use in applications where run-overs cause outages by crushing the conductors of round cables.

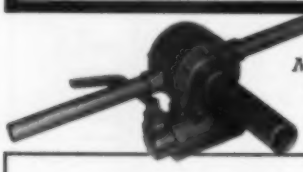
EXTRA TREATED DIESEL-ENGINE CRANKCASE OIL

D-A extra-treated diesel oil, product of D-A Lubricant Co., Inc., is compounded especially for use in high-speed and supercharged diesel engines. The new lubricating oil offers greater protection against valve and ring sticking, and its high detergency reserve inhibits sludging to a greater extent, the company says.


Super Scale for Conveyors
Builders Conveyoflo is unsurpassed for accurate weight-metering of belt conveyor flows. Pneumatic system gives full-range metering with minimum vertical belt deflexion. Compact — no overhead framework or complicated lever arms. For Bulletin 550-H4A, write Builders-Providence, Inc., 395 Harris Avenue, Providence 1, Rhode Island.
BUILDERS-PROVIDENCE
DIVISION OF B-I-F INDUSTRIES, INC.
BUILDERS IRON FOUNDRY • PROPORTIONEERS, INC. • OMEGA MACHINE CO.
METERS
FEEDERS
CONTROLS

Teamed up for...
Faster, Safer
DRILLING!

SCHROEDER
Hydraulic
COAL DRILL



MODEL
12-B

Safe, dependable, fast drilling with complete safety . . . no spark, no kick . . . all electrical hazards removed yards from drill. Light weight Model 12-B is powered from hydraulic systems of standard mining equipment or can be furnished with Schroeder Tricycle Hydraulic Mobile Power Unit. Features minimum of operating parts and reduced maintenance costs.

SCHROEDER
BH DRILL BIT

BH-1
BIT

For hydraulic hand-held coal drills, assures faster drilling with less effort as a result of . . .

1. Reduced area of penetration for ease of feed.
2. Greater clearances reduce drag.
3. Heat treated forged steel bit body.
4. Tough carbide tips hold cutting edge longer.

Send today for details and prices.

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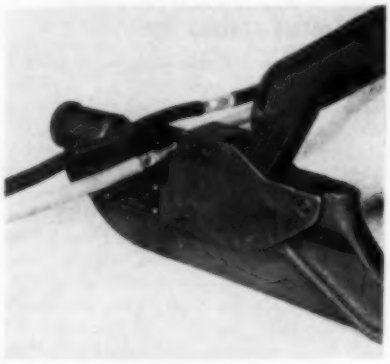
HYDRAULIC, ELECTRIC & PNEUMATIC
MINING EQUIPMENT

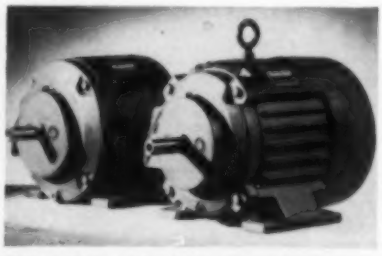
TESTED CABLE REELS

Three new explosion-tested cable reels, for either hydraulic or electric drives, are offered by Ensign Electric & Mfg. Co. Smallest is designed for either vertical or horizontal operation at continuous capacity of 100 amp. The largest, 250 amp, continuous, holds 400 ft of 1/0 cable (*Coal Age*, August, 1954, p 102).



RAPID, HIGH-STRENGTH CABLE SPLICES

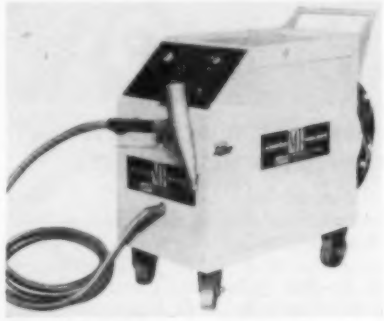
A new compression method for making emergency or permanent splices on mining machine cable from No. 8 stranded through 4/0 is available from the Burndy Engineering Co. Burndy Hylinks, made of pure electrolytic-copper seamless tubing, are installed by use of the Burndy Hytool MY29-11. Splices are said to withstand tensions up to 6,400 lb (*Coal Age*, July, 1954, p 94).



NEW AC, DC MOTORS BUILT FOR MINING APPLICATIONS

A new line of "Totally Protected" AC motors, illustrated above, are offered by Reliance Electric & Engineering Co. for mounting in any position with complete protection against drip, splash and falling objects. A complete integrated line is available, including enclosed fan-cooled, corrosionproof and explosionproof designs (*Coal Age*, April, 1955, p 108). Bulletin B-2401 available.

Reliance also exhibited its new line of "Super T" DC motors, designed to provide the fastest most accurate response ever offered in a standard design motor, the company states. The Super T accelerates to full speed in half the time formerly required, has lower mechanical and electrical inertia and improved commutation. Various enclosures in ratings from 20 to 100 hp are available and the size range is to be expanded both upward and downward (*Coal Age*, January, 1955, p 98). Bulletin C-2002 available.



NEW-PRINCIPLE WELDER

A new semiautomatic welding machine manufactured by the Amsco Div. of American Brake Shoe Co., is said to combine the advantages of hand welding and automatic welding, while eliminating most disadvantages encountered with either. The new MF welder feeds bare wire from a coil through a hand-held hopper containing magnetic flux, which clings to the wire as it leaves. By using only one type of wire and changing the flux, various deposits can be made. It is easily connected to any conventional AC or DC welding machine operating over a range of 150 to 500 amp (*Coal Age*, November, 1954, p 120).

SOCKETLESS HOSE AND FITTINGS KIT

A new socketless fittings and hydraulic hose kit, made by the Aeroquip Corp., includes 17 popular fittings and 24 ft each of hose in both ¼- and ⅜-in sizes. The kit permits reductions in inventory by dispensing with costly stocks of ready-made hose lines (*Coal Age*, September, 1954, p 132A). Bulletin 134 from Aeroquip.

NEW PRODUCTS PROMOTE INCREASED SAFETY

A new Self-Rescuer with a redesigned carrier, a cannister-type dust-collector for roof-drilling operations and a new trip lamp powered by the company's R-4 battery were among the products exhibited by Mine Safety Appliances Co. In addition, the company also featured a fluorescent lighting fixture for face operations, a loudspeaking safety-message repeater and a new MinePhone assembly in a dust-tight box designed for simplified maintenance. Another innovation is a HoistPhone power unit designed for attachment to the cage and powered through the rotation of a rubber tire running on the guides to turn the generator.

SAVINGS that build PROFITS in run-of-mine scalping

Heavy duty, run-of-mine *Ripl-Flo* vibrating screen.

SAVES SPACE

This Allis-Chalmers run-of-mine *Ripl-Flo* vibrating screen occupies only a fraction of the space required by a slow speed shaker of equal capacity. Small size simplifies plant layout and saves space.

SAVES HORSEPOWER

Because of its smaller size, this screen reduces the horsepower required to do the shaking job by approximately 50%.

SAVES MAINTENANCE

The heavy duty run-of-mine *Ripl-Flo* screen has a simplified two-bearing construction. Fewer parts mean fewer replacements and less time out for repairs. Oil-lubricated mechanism requires little attention. Your production time is increased . . . your maintenance time is reduced.

PROMOTES PLANT EFFICIENCY, TOO

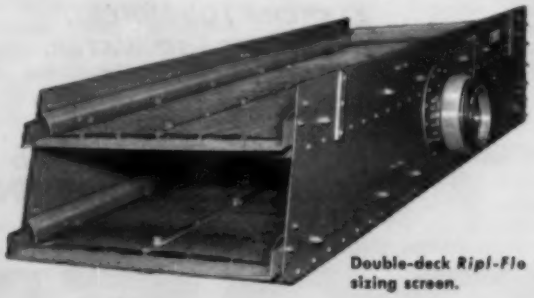
Recovery of egg, nut, stove, and stoker sizes can be increased as much as 4% when these heavy duty screens are used to remove 7x0, 6x0 and 5x0 coal ahead of rotary breakers.

For complete information, see your nearby A-C representative or write Allis-Chalmers, Milwaukee 1, Wisconsin, for Bulletin 07B7868.

Egg, Nut, Stove, and Stoker Sizing

The wide range of standard heavy duty *Ripl-Flo* vibrating screen sizes meets every sizing application. These screens can also be supplied with *Sta-Kleen* decks and electrically heated decks for screening fine moist coal.

An A-C Screen for Every Phase of Coal Preparation — scalping and dry sizing, wet sizing and dewatering. A-C screens are applied following such equipment as jigs, sand cones, chloride washers. They're used in heavy density plants for pre-wetting and media recovery, as filter screens for recovery of fines and water clarification.



Double-deck *Ripl-Flo* sizing screen.

Ripl-Flo and *Sta-Kleen* are Allis-Chalmers trademarks.

ALLIS-CHALMERS

A-C ALLIS-CHALMERS

A-4662

ROEPRENE MINING CABLE

Flexible tinned copper conductors insulated with rubber or synthetic rubber compound
Braided copper grounding conductor
Yarn reinforcing braid
Yarn reinforcing braid
Conductors cabled together
ROEBLING 2 AWG P-111 EM 1955

ROEPRENE Mining Cables are approved by the Pennsylvania Bureau of Mines Approval P-111, and comply with the requirements of the U.S. Bureau of Mines for flame resistance.

YOU WANT

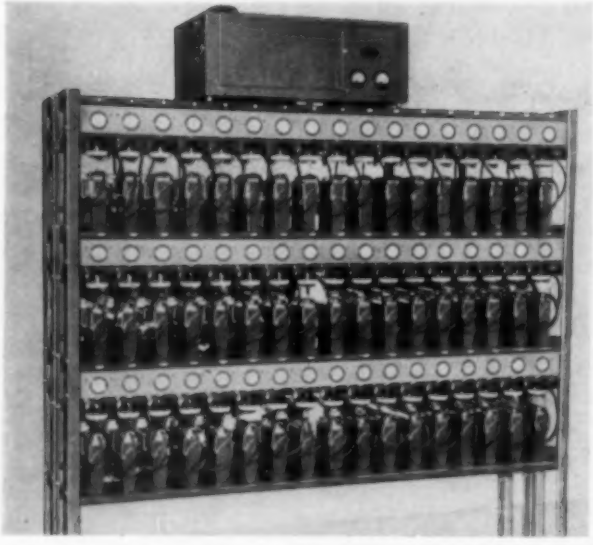
FLEXIBILITY,
EXTREME TOUGHNESS,
RESISTANCE TO WATER,
OIL AND OZONE,
MAXIMUM LIFE...
IN SHORT,

YOU WANT

ROEBLING

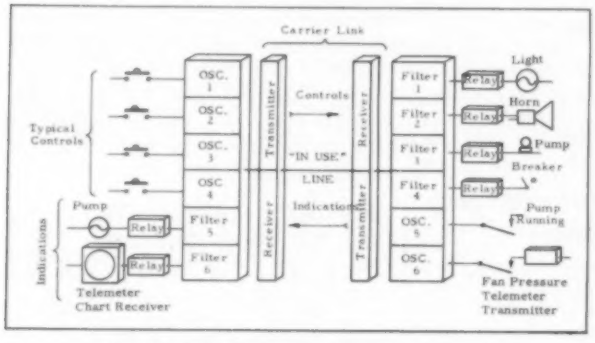
Subsidiary of The Colorado Fuel and Iron Corporation

JOHN A. ROEBLING'S SONS CORPORATION, TRENTON 2, N. J. BRANCHES: ATLANTA, 934 AVON AVE. • BOSTON, 51 SLEEPER ST. • CHICAGO, 5525 W. ROOSEVELT RD. • CINCINNATI, 3253 FREDONIA AVE. • CLEVELAND, 13225 LAKEWOOD HEIGHTS BLVD. • DENVER, 4801 JACKSON ST. • DETROIT, 915 FISHER BLDG. • HOUSTON, 6216 NAVIGATION BLVD. • LOS ANGELES, 5340 E. HARBOR ST. • NEW YORK, 19 RECTOR ST. • ODESSA, TEXAS, 1920 E. 2ND ST. • PHILADELPHIA, 330 VINE ST. • SAN FRANCISCO, 1740 17TH ST. • SEATTLE, 900 1ST AVE. S. • TULSA, 321 N. CHEYENNE ST. • EXPORT SALES OFFICE, TRENTON 2 N. J.



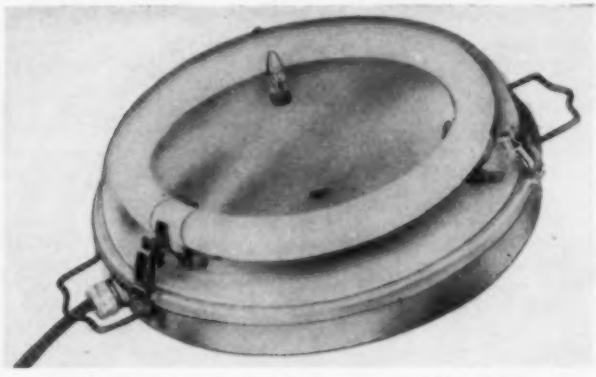
Automatic Charger Meters Each Lamp

The new Wheat automatic charging rack offers several design features for better service and less maintenance of cap lamps, reports National Mine Service Co. Utilizing Wheat automatic charging with electronically controlled voltage which automatically puts each lamp on charge for only the current needed to complete its charge, each standard unit accomodates 51 lamps. The rack is constructed mainly of stainless steel and aluminum, is easily kept clean and readily assembled, disassembled and moved. Bulletin from NMS.



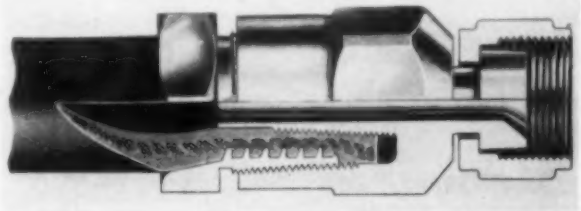
Varied Remote-Control and Indicating Systems

New Femco, Inc., "Bit Step" and "Bit Carrier" remote-control, indicating and monitoring systems are available for a wide range of mine applications. Systems are custom-designed to meet individual requirements, but utilize basic equipment units to keep cost low. The systems operate on two wires which, in various circuits may be existing lines, power or telephone lines, etc. Typical installations provide for required indication and/or control of fans, pumps, circuit breakers, rectifiers, bearing temperatures, air and liquid pressures, etc. Detail data on application possibilities from Femco.



Lighting for Underground Workings

As an entirely new concept in mine lighting, its new M-1 fluorescent mine lights provide the equivalent of factory lighting underground, according to the American Mine Supply Co. Lightweight and readily portable, the circular lights have a safety switch that cuts off the current when the Plexiglass cover is removed. They are quickly installed on spads as the face advances and are fully recoverable for re-use.



Hydraulic Couplings for Speedy Assembly

New Joy line of "Surgepruf" reusable hose couplings for rubber-covered hydraulic hose in medium-high and high-pressure service features "double-wedge" grip and has special slotted bushing for retightening coupling without disassembly if loosened by vibration or flexing. No special tools are needed for installing coupling. Necessity for skiving rubber-covered hose also is eliminated by coupling design. Bulletin H-100 with full data on couplings, hose assemblies and hose from Joy Mfg. Co.

Induction Motors Feature Smaller Housings

Featured in the Westinghouse Electric Corp. exhibit were cutaway models of redesigned "LifeLine A" induction motors with improved ventilation, better insulation and a more-efficient and better protected bearing. New smaller housings in the LifeLine series, conforming with NEMA specifications, are supplied in several styles, such as dripproof and splashproof. Sizes from 1 to 30 hp, NEMA, are available. Westinghouse also featured USBM explosionproof motors.

LOW-TYPE JACK EQUIPPED WITH INDEPENDENT PUMP

Duff-Norton's "Lo-Hite" hydraulic jack is a 4⅝-in-high ram with a raise of 2 in and a 30-ton capacity. The ram is powered through an independent hydraulic pump, thus making it possible to insert the ram into confined spaces for jobs such as pressing, spreading, straightening, positioning and so on. Also on display in the Duff-Norton Mfg. Co. booth was the new Coffing Super Power hoist having a maximum capacity of 5 tons (*Coal Age*, January, 1955, p 102).

FOUR NEW PUMPS FOR MACHINERY LUBRICATION

Four new series of automatic lubricating pumps for mining and other machinery, operating through Type M feeder systems, were shown by the Trabon Engineering Co., as follows: the double-acting HLJ Series "Hydra-Lube" pumps (Bulletin 5531) and the single-acting HLS Series (Bulletin 5533) are designed for automatic lubrication of mining machinery, machine tools and other hydraulically powered equipment. They are connected to the supply line or lines of the hydraulic system and require no special valves. The single-acting ALS Series "Air-Lube" pumps (Bulletin 5535) are for pneumatically powered or controlled equipment, connecting easily to the supply line of the pneumatic system without special control valves. The cam-driven MLS Series "Mechanical-Lube" pumps (Bulletin 5537) are for use where a fairly frequent movement of the machine itself is desired as the power source of the lubricating system and offers compactness and simplicity of design. Full details of sizes and capacities in bulletins noted.

CRUSH-RESISTANT WIRE ROPE HIGH-STRENGTH SPLICE

Newly developed "SpringKore" wire rope, featured by Jones & Laughlin Steel Corp., utilizes a tightly coiled high-quality steel spring for the center of the rope to provide unusually high resistance to crushing and extreme flexibility. Available from stock in standard constructions, SpringKore is said to maintain both the rope diameter and clearance between strands much longer and also spools better. New J&L "JalKamp" is now available for a wide variety of terminal splices and wire-rope slings. Basically a non-corrosive special-alloy sleeve squeezed around the rope by a special high-pressure hydraulic press, JalKamp provides a low-cost, permanent splice with full rope strength. Folder AD176 from J&L.

INTEGRAL HYDRAULIC LUBRICATOR ON MACHINE

"Hydra-Luber" is a high-pressure lubricating system that may be inserted into the hydraulic system of a mining machine to propel lubricant through a hose and gun for greasing the fittings on the machine. The unit, offered by Schroeder Bros., consists of a lubricant reservoir, a pump actuated by the hydraulic system of the mother machine, and the necessary hose and gun to serve the most-distant fitting on the machine. Positive lubrication is the big advantage, the maker states.

HIGH-PRESSURE HYDRAULIC PUMP

Its new "Porto-Power" P-228 hydraulic hand pump is a low-cost answer to the need for an extremely high-pressure pump, according to the Blackhawk Mfg. Co. Compact and sturdily constructed, it develops 40,000 psi for removal of bearings, special laboratory testing, and special hydraulic systems. Blackhawk's new FZ-15 "Maintenance Assortment" provides a packaged assortment of Porto-Power equipment for the handling of a wide range of maintenance and repair problems. It contains a pump, four rams in various sizes and some 41 attachments for various uses. Blackhawk Catalog H-201 gives full details.

WIRE ROPE 15% STRONGER, NEW LOW-COST SLINGS

A new grade of extra-high-strength "Yellow Strand Powersteel" wire rope made of higher-carbon wire having a breaking strength 15% greater than standard Yellow Strand has been announced by Broderick & Bascom Rope Co. The company also has available its new "Steeloc" wire-rope locking device that permits fabricating slings at lower cost. The new Yellow Strand Powersteel rope is recommended by the maker for tough jobs where extra strength is needed. Slings made with the Steeloc device do not require expensive hand splicing, yet have greater strength since the ductile heat-treated device matches the hardness of the rope and locks into all strands (*Coal Age*, May, 1955, p 132).

COATS NEW OR OLD GALVANIZE SURFACES WITHOUT ETCHING

Rust-Oleum Corp.'s new "Galvinoleum" has been developed for application on new, old, unpainted or partly rusted galvanized surfaces without etching and without the need for weathering, and also may be used on aluminum and terneplate roofing. It is a semi-gloss finish available in four colors: red, metallic, gray and green, and may be applied by brush or spray. Folder 135 from Rust-Oleum.

HIGH-STRENGTH WIRE ROPE INCREASES SERVICE LIFE

A new high-strength wire rope, reportedly 15% stronger than the best grades now being manufactured, is offered by the wire rope division of American Chain & Cable Co. An average tensile strength of 300,000 lb has been achieved through the use of special steels and tests have shown service life more than double that of existing types. Known as VHS (very high strength), the rope will be available in sizes from ⅝ in to 2 in. Fuller details in *Coal Age*, March, 1955, p 110.

OPEN-GEAR AND WIRE-ROPE GREASE FOR TOUGH SERVICE

New "Sohitac" lubricant was specially designed as a highly adhesive grease for open gears and wire rope. It resists throwing off or balling up and is unaffected by snow or rain, reports the Standard Oil Co. (Ohio). It requires no heat to apply and stays on the job longer under the heaviest gear loads because of its extreme-pressure qualities and high heat resistance, it is said.

LUMINESCENT ROOF COATINGS FOR COLOR CODING

"Chemsol" mine-roof coatings, containing no toxic or flammable solvents, can be applied on damp, dry or wet surfaces and may be supplied with blue, red, yellow, orange, white or clear luminescent materials for color coding and raising light levels. Yellow luminescent, for example, is recommended for indicating alternate escape routes. Further information from American Chemsol Corp.

LUBRICANT STICKS TO PARTS, RESISTS BREAKDOWNS

"Plastishield," displayed by the Warren Refining & Chemical Co., is a combination of "Plastigear" and Warren "Liquid Gear Shield." It may be applied with a brush or swab or through an automatic gear-spray system. The solvent evaporates in a short time, leaving a thin, sticky and adsorbed film of lubricant. Under pressure, the solids portion of the lubricant are said to be carried into the gears and moving surfaces. Its ability to stay on exposed parts, and resistance to breakdown and to extreme cold or heat conditions are said to make Plastishield an adaptable lubricant for gears, chains, shovel sticks, and wire rope and cable.

BELT-REPAIR SUPPLIES

Flexible Steel Lacing Co. offers Flexco speed tools, described in Bulletin F-112, which take a lot of the hard work out of joining a belt and speed up the job as much as 50%. Also shown at the Flexco booth: Rema line of self-vulcanizing belt-repair material, emloying chemical action rather than heat and permitting immediate use of belt without curing tire. Repair tools and Rema are described in *Coal Age*, August, 1954, p 104.

STRONGER STEEL-CORE WIRE ROPE FOR EARTH MOVING

"Royal Blue" wire rope, by John A. Roebling's Sons Corp., is 15% stronger than ropes marketed heretofore as a result of the development by Roebling of Type 1105 wire, the toughest rope wire produced, the company says. The new rope is manufactured primarily in preformed constructions in sizes ranging from ¼ in to 3½ in. all with independent wire rope core. Applications include mining machines, slushers, rotary rigs, shovels, draglines and so on (*Coal Age*, March, 1955, p 110).

HIGH-STRENGTH BELT SPLICE

"MINET" hinge-type conveyor-belt splice developed and used for 4 yr abroad is now available from the Hewitt Rubber Co. of Pittsburgh. It can be installed in a few minutes with a hammer and nippers and requires no measuring or use of templates, guides or accessory tools, it is said. A tight splice avoiding leakage is provided, danger of pullout is eliminated, rupture is unlikely and the splice will operate over much smaller pulleys and ride easily over idlers and scrapers, the company says (*Coal Age*, October, 1954, p 124).

INSULATED PANEL EASILY ERECTED FROM OUTSIDE

The latest addition to H. H. Robertson Co.'s line of Q-Panel walls is the M-type. Two distinct advantages listed by the maker are: erection from the outside of the building, thereby eliminating the need for interior scaffolding; and an unusual method of locking the components of the panel together that eliminates exposed fasteners and provides an unmarred exterior wall surface. Only 3⅜ in thick, its insulating quality is said to be superior to a 12-in brick and tile wall plus a furred plaster interior. The outside sheet is available in aluminum, stainless steel or Galbestos.

MOISTURE ABSORBER FOR ELECTRICAL COMPONENTS

A small-diameter, tubular-type flexible synthetic bag holding dehydrating material available in various sizes, has been introduced by National Mine Service Co., as a means of reducing moisture and the corrosive effect of dampness in electrical compartments in and around mines. Said to be particularly useful in electrical control panels, the unit also can be fitted into idle electric motors and other enclosed and confined places (*Coal Age*, July, 1954, p 97).

SMALL but MIGHTY!

Compton Budget Model 28 Coal Auger

Ideal for narrow pits and short benches

Here it is! The mighty mite of the Compton Coal Auger family—Model 28—designed, like its big brothers, to raise production figures and cut operating costs—This new machine will produce up to 50 tons per hour. Only 28 feet long, light weight and easily moved from pit to pit with optional available tail wheel assembly, this Compton Coal Auger enables a 3 man crew to efficiently handle tough mining assignments in pits and/or benches as small as 30 feet—augering to a depth of 150 feet.

Model 28 incorporates many of the time-proven features found only in Compton Coal Augers:

1. Model 28 with all size cutting heads drills coal within 4¾" of the bottom—assuring maximum recovery.
2. Easily accessible auger sections racked on the frame.
3. Elevating conveyor is integral part of the machine.
4. Hydraulic jack legs (with self-leveling pontoons) allow drilling up to 150 feet without misalignment.
5. Single or vertical overlapping holes can be drilled for greater recovery.
6. Easy to move along working face of highwall.

It will pay you to look into the advantages of the Compton Coal Auger. A Compton representative will help you review your property for the proper auger application.

GENERAL SPECIFICATIONS
MODEL 28

Length: 28 feet
Weight: Approx. 25 tons
Carries 12—12½ ft. auger sections
Required pit width: 30 ft. min.
Power: 175 hp Diesel engine
Hydraulic Frame Jack Lift: 54 inch
Auger Diameter: 44" to 28"
Max. Drilling Depth: 150 feet

Cutting Head: Compton non-clogging type with built-in spider bearing assembly provides straighter drilling with less frictional drag.

Compton, Inc.

ORIGINATORS OF COMPTON LUMP RECOVERY HEADS

BOX 1946 TELEPHONE 4-6384 • CLARKSBURG, WEST VIRGINIA

FOREMEN'S FORUM

THE PLEASANT UPTURN is not an indication that the coal industry is in the clover.

The Business Upturn . . . How It Affects Foremen

The mere fact that the production curve is rising does not mean that you can relax. Keeping the curve of production on an upward course depends upon keeping the cost of coal at the customer's bin in balance with the cost of other fuels.

PRODUCTION FIGURES for 1955 are gratifying, particularly when viewed against the discouraging record of last year. The coal industry is producing about 1 million tons more per week than a year ago.

But the harsh truth is that coal is operating far below its level of production in most other years since the close of World War II. The ACI Bulletin, a weekly publication of Appalachian Coals, Inc., in the issue dated April 28, 1955, presents production totals for the first 15 wks of 1955 in comparison to similar periods in recent years, as follows:

1955	126,368,000 tons
1954	111,091,000 tons
1953	130,875,000 tons
1952	158,422,000 tons
1951	166,115,000 tons
1949	153,059,000 tons
1948	149,139,000 tons
1947	187,623,000 tons

You see that although there has been an upturn, it is not yet of carnival proportions. We probably are on the threshold of coal's long-promised future, when, we have been told, coal will be needed in amounts up to a billion tons per year. On the other hand, we may not be on that threshold. The ding-dong competitive battle with other fuels still rages, and a clear-cut victory for these substitutes will further delay coal's realization of its promised possibilities.

Let's try to learn some lessons from the galling experiences of the recent past. The industry looks much different today than it did 2 yr ago. What are some of these differences? What do they mean to foremen?

In the first place, there are fewer foremen! In passing through the wringer, the industry was pressed into some drastic choices. As you know, high-cost mines were closed and production was concentrated in the newer mechanized mines and in stripping. The combined effect of these developments is to make your profession more competitive. We can't dodge the fact that good mine supervisors through no fault of their own are out of work. They are looking for places to light.

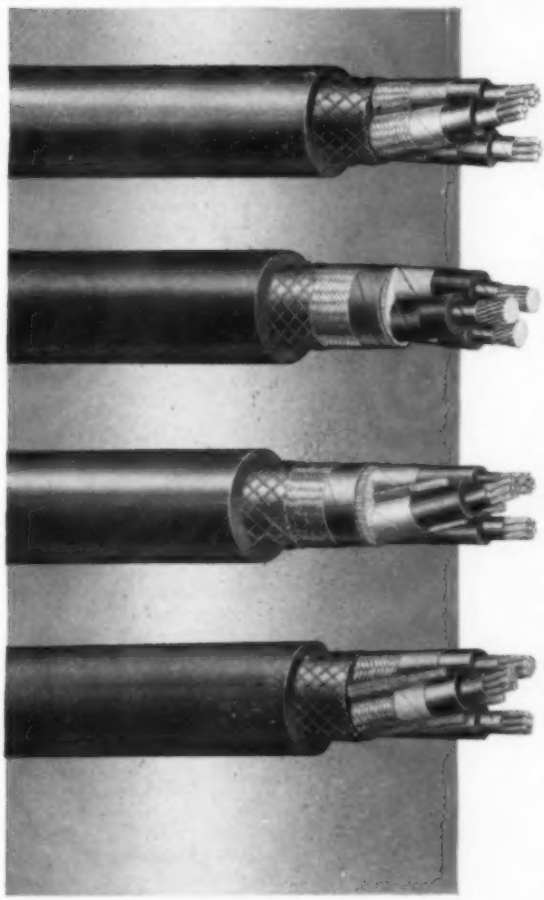
Secondly, the pace is faster. It has to be. The answer to high costs in most instances is increased mechanization. The machines have substantially increased productivity, but they demand constant attention in achieving these ends. Keeping them in effective operation requires alert, sharp supervision.

Those are perhaps the major changes affecting foremen personally. Then, too, mining companies have learned some corporate lessons.

The ACI Bulletin points out that

Avoid costly "Downtime" with U. S. Royal Shielded Portable Power Cables

Shielded Portable Power Cables, Type SH, are preferred (or generally used) for the distribution of power to portable equipment at voltages above 2000. Shielded cables provide greater protection to the insulation and are safer to handle than other types of portable cables. These cables are of the four types listed below. Where maximum safety is desired, type SH-D cables are recommended.



U. S. Royal SH-A Cables consist of three or four flexible coated annealed copper conductors covered with a semi-conducting tape. Each conductor is insulated with U. S Uskorona-1 oil base compound, and covered with colored tapes and a braided coated copper shield. The conductors are then cabled and covered with a reinforced jacket of 60% black neoprene. The shielded braid over each insulated conductor eliminates corona cutting by static discharge through equalization of surface stresses.

SH-B cables consist of three or four flexible coated annealed copper conductors covered with a semi-conducting tape. Each conductor is insulated with U. S. Uskorona-1 oil base compound plus colored tapes. Conductors are then cabled with jute fillers, covered with a rubber-filled tape, a braided coated copper shield and reinforced 60% black neoprene jacket. The shielding braid protects the men handling the cable in the event of fault currents.

SH-C cables consist of three or four flexible coated annealed copper conductors covered with a semi-conducting tape. Each conductor is insulated with U. S. Uskorona-1 oil base compound and covered with a colored tape. The conductors are cabled with jute fillers and with the specified fabric-covered ground wires in the conductor interstices; then covered with a rubber-filled tape, braided coated copper shield and a reinforced 60% black neoprene jacket. This allows grounding of equipment and provides an adequate low-resistance path for short circuits, thus insuring circuit breaker operation. The grounded equipment provides protection to workmen under fault conditions.

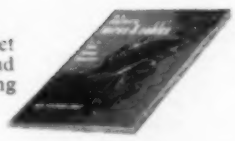
SH-D cables consist of three or four flexible coated annealed copper conductors covered with a semi-conducting tape. Each conductor is insulated with U. S. Uskorona-1 oil base compound and covered with a colored tape and a braided coated copper shield. The conductors, together with fabric-covered grounding conductors, are cabled and covered with a reinforced black 60% neoprene jacket. The conductor shielding, when properly grounded, equalizes surface stresses and draws off all capacity charging currents, insuring safety in handling. An adequate low-resistance ground for the equipment is provided by the grounding conductors.

All shields and grounding conductors, when used, should be properly and thoroughly grounded.

The constant dragging, flexing, twisting and bruising encountered in heavy service will not bother U. S. Royal Shielded Cables. You'll find that U. S. Royal never runs you into "downtime"—it's the most dependable, efficient cable you've ever used.

United States Rubber Company is the only electrical wire and cable manufacturer to grow its own natural rubber, make its own synthetic rubber and its own plastics. This permits control of the production process—resulting in a quality product.

Send for illustrated booklet on U. S. Electrical Wires and Cables for the coal mining industry.



UNITED STATES RUBBER COMPANY
ELECTRICAL WIRE AND CABLE DEPARTMENT, ROCKEFELLER CENTER, NEW YORK 20, N. Y.

US RUBBER

commercial mines in District 8, which includes mines in southern West Virginia, eastern Kentucky, Virginia and Tennessee, lost an average of 8c per ton on the 212,300,000 tons mined in the district in the two lean years. That's $16.5 million. Some companies did not have the money to lose, so they had to go under.

The others used whatever cash reserves they had, then mortgaged a portion of their future by borrowing money.

The lesson to be learned is that adequate cash reserves can save a company and the jobs it provides, when the industry passes through a period of strain. The temptation to castigate management for putting "rainy day" money aside in prosperous times is difficult to resist. Many people wonder why that money is not thrown into the common pool and shared among the company's employees and owners. The next time you hear anyone spring that idea you can begin talking about how bad the situation became back in 1954. And how some companies got through by the skin of their teeth on the money they had laid aside.

What's ahead for coal?

Well, the pleasant upturn in consumption and production is by no means an indication that the industry is in the clover. Healthy profits have not yet returned because coal prices are down, many below the break-even point.

The demand right now is for continued emphasis on controlling operating costs. Each foreman can help by making a determined effort to get the best possible performance out of his unit.

Flying Trapeze Department

THE NETHER REGIONS of the National League have been the scene of some boiling activity in the first weeks of the baseball season. We follow the fortunes of the Pittsburgh Pirates. Along about April 20 we found our team trailing the league-leading Brooklyns by seven games, in spite of the fact that we had played only six!

But then we won a game. You may not view this as a large achievement, but do you know it put us within 1½ games of the New York Giants, the Peerless Champions of All the World?

However, these conniptions were only a foretaste of things to come. In the early dawn of Sunday, May 1, the standings of the teams involved in these matters looked like this:

Team	Won	Lost	Average	Games Behind
Brooklyn	14	2	.875	....
.....	..	..	....	....
Cincinnati	4	12	.250	10
Pittsburgh	3	10	.231	9½

How do you like this turn of events? The Reds are 10 games off the pace, we trail by only 9½, yet somehow we have managed to fight off the Cincinnati threat.

The next morning, May 2, the standings of the three teams are as follows:

Team	Won	Lost	Average	Games Behind
Brooklyn	15	2	882	....
.....	..	..	....	....
Pittsburgh	4	11	.267	10
Cincinnati	4	13	.235	11

Brooklyn won a single game yesterday while we split a doubleheader, thereby widening the gap between us and the Dodgers. But in losing ground to the Dodgers, we jumped up one notch in the standings. Bro-ther!

We include this history of the ups and downs of the Pirates to illustrate that a fellow's position in life is not always of his own making. His fortunes are inextricably bound to the fortunes of others, just as the standing of the Pirates depends in great measure upon whether the Reds win or lose.

This is true in foremanship, too. You can't be a good foreman all by yourself. The men who work for you and your fellow supervisors have a decided influence upon the quality of your performance. But unlike baseball, where you gain from another's loss, this matter of being a good foreman stipulates that you gain most when you help another fellow do his best work.

Enjoying Your Vacation

VACATION TIME is here again. This is the time to unwind, the time to take the nose from the grindstone, the time to drop all the restraints we must endure in the remainder of the year. All but one restraint, that is. Even on vacation we must keep safety discipline in mind.

Look at it this way: Someone makes his living out of any activity you are likely to pursue on your vacation.

You swim?

Many people swim for a livelihood.

You will take an auto trip?

A number of people drive cars, trucks or buses to earn their daily bread.

You fish?

A number of people work at fishing.

The point is: The people who work at these pursuits observe safety rules which may be every bit as demanding as the rules governing your actions in the mines. So don't disregard their rules when you move over into their professions.

Always swim with a buddy. Stay out of deep water unless an accompanying boat is nearby. Keep a sharp eye on the youngsters. Keep your fish-hooks and lures out of other people's hides—and out of your own. Employ reason in your driving.

Take care, and have a wonderful time!

Lonely Genius

Mortal darkness enfolds the awe-inspiring mind of Albert Einstein, the mind chosen by God to transmit some of His precious secrets. This is the man whose thinking was done at the dizzying heights where others dared not venture. He has been so far ahead of his contemporaries that he propounded valid theories years before anyone could find ways to test them.

But the dizzying heights and the places far out in front always are lonesome. A genius is a lonely man. There are few people to converse with him because so few can begin to understand him. He gets little real pleasure out of conversation anyway, because no one is able to challenge his mind. We suppose it comes down to this: A genius must learn to live comfortably within himself if he is going to fulfill the promise of his genius. The prodigies who can't learn to do this explode.

Albert Einstein had the proper self-discipline a genius requires. The material trappings meant little to him. He seemed to be aware that he was steward and proprietor of a wondrous mind, and he shaped his entire life and personality around this situation. Thus he developed his talent to the fullest degree.

Even now, therefore, Einstein has a lesson to teach us. It is this:

We must properly evaluate our talents, no matter how meager, then practice whatever self-discipline is necessary to develop fully those talents. That is why we are here.

Moisture in Mine Air

You no doubt have noticed how moisture condenses in great quantity on mine roof at this time of year. It's part of the yearly cycle of cold-weather dryness and summertime high-humidity in the underground workings. But do we fully realize the tremendous forces in action? At changes of season, the ventilating air literally moves tons of moisture into or out of the average coal mine.

As long ago as 1908, H. N. Eavenson calculated that in the winter months moisture was removed at a rate of 69 tons per 24 hr from a West Virginia mine passing 200,000 cfm. In the summertime, moisture deposition within the workings was in the order of 23 tons per 24 hr.

The significance of these facts may elude us because we don't see the forces in action. But when we take a good look at Mr. Eavenson's figures, we see that perhaps this function of the air merits a lot of attention.

Our first reaction is that we should be diligent in rockdusting during the cold weather, when the dryness of the workings increase the dust hazard. But further reflection tells us that it is equally as important to control coal dust now in the more humid weather. Otherwise, this summer's dust can be dehydrated in a jiffy during next winter's drought, thereby creating a hazard.

FOR A HIGHER RATIO OF COAL PER SHOT USE KING RED CROWN

the GRAIN makes the difference

More coal at less cost per shot . . . that's what King Red Crown gives you. Here's why: RED CROWN has a patented *granular* structure . . . and every grain contains a balanced explosive composition. This results in a slow, heaving, spreading action similar to that of black powder.

You get more, better, cleaner lump coal with a minimum of slack . . . at less cost per shot. Smoke, fumes and downtime are cut to a minimum.

Write or phone today for a demonstration right in your mine. You'll find KING RED CROWN is the most effective, most efficient form of controlled power ever provided in Class A permissibles.

RED CROWN

THE *ONLY* SURFACE SENSITIZED PERMISSIBLE

THE KING POWDER CO., INC.

CINCINNATI 1, OHIO

MAKER OF QUALITY EXPLOSIVES SINCE 1878

OPERATING IDEAS

WEAKENED CONDITION of the tie has resulted in general deterioration of joint, loose bolts and rail damage.

GENERAL DETERIORATION OF TIES, missing and loose bolts at this switch endangers the entire system.

BADLY WORN FROG reflects general lack of maintenance. The frog is cluttered up and bolts are loose.

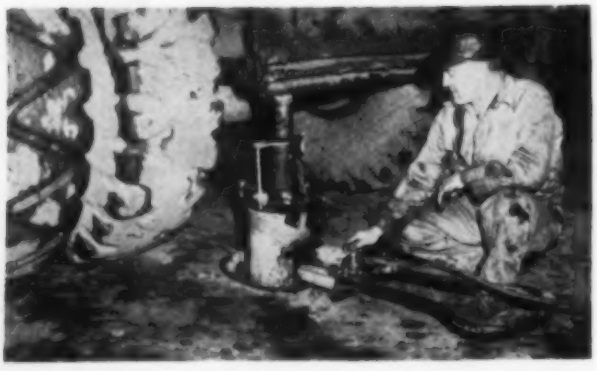
Check Rail Facilities For Efficient Operation

NOW that warm weather is here, it's time for management and maintenance engineers to spot-check rail facilities. Neglect of track facilities results in inefficient movement of materials, lost time, money and labor, and conditions that may lead to serious equipment damage or injury to personnel.

As an aid in evaluating the conditions of plant trackage and alleviating any deficiencies, rail specialists of the L. B. Foster Co., Pittsburgh, point out the following as some of the poor track conditions that usually exist:

1. **Poor drainage around ties,** loose bolts and excessive rail expansion should be corrected before they cause excessive rail wear that leads to costly down time.
2. **Old or worn tie plates** should be replaced before they produce loosening of bolts and spikes, and rail break at joints resulting from heavy batter.
3. **Check for deterioration of rail ties.** This condition results from poor drainage and can cause loose bolts, damage to rail at joints and rail expansion.
4. **Poor switch conditions** endanger the entire track operation. Factors responsible may include loose or missing bolts, heavy growth and poor drainage.
5. **Remove debris collected** between rail and switch. It will cause trouble, including possible derailment.
6. **Check for badly worn frogs.** Wear is a sign of poor maintenance such as collection of debris and pebbles that prevent proper functioning.
7. **Make sure that rail switches** are adjusted properly so they can open and close efficiently. Poorly adjusted switches can result in damage and possible failure of the entire track system.

Air-Powered Hydraulic Jack Handles Heavy Trucks



RAISING a big truck off the floor to remove a tire or make repairs doesn't have to be a slow, tedious job. Herbert Scott, night maintenance supervisor at The Colonial Mining Co., Madisonville, Ky., made this air-powered hydraulic jack to make the job easier. The shop-made unit can be placed in inaccessible locations where a conventional floor jack couldn't be used. It also can handle heavier loads much faster than a hand-operated jack.

A piece of 10-in pipe with top and bottom covers serves as a hydraulic reservoir. Oil is delivered to a hydraulic jack welded to the top cover by a pump in the lower section of the jack. An air cylinder, similar to those used on automotive lubricating equipment, operates the hydraulic pump.

To put the unit in operation, it is placed under the truck and a compressed-air hose is attached to the valve at the base of the jack. The valve leading to the air cylinder is opened, permitting air to enter the air cylinder. When the truck has been raised as high as desired, the compressed air inlet valve is turned off. A semi-circular steel safety block is placed around the extended jack to prevent the truck from dropping if the jack should collapse. The jack has a 13-in travel although it is seldom necessary to raise a truck more than 6 inches.

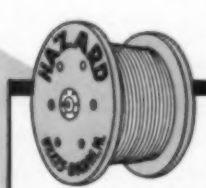
Bessemer

operation proves that Hazacords can take punishment

All the units in this operation are "big bruisers", selected for ability to operate on a big scale under the most difficult conditions. At this Bessemer Limestone and Cement Company limestone quarry the five-cubic-yard dippers can load at the rate of 400 tons per hour. The blasting, rock dust and rough ground mean that only top quality materials can keep all operating equipment from trucks to electrical cables continually on the job.

Operating at 4160 volts, the Hazacord Type SH-C, 5-kv portable cables have proved themselves able to withstand the worst treatment this operation can provide. The extremely durable Hazaprene ZBF sheath is excellent protection against the constant scraping, twisting and dragging that is normal in this type of operation. Hazard Keystone rubber insulation and shielded construction provide long electrical life and maximum protection for personnel when handling the cables.

No matter what the type of installation, there is a Hazard cable that will handle power distribution up to 15,000 volts. Ask your Hazard representative or write Hazard Insulated Wire Works, Division of The Okonite Company, Passaic, New Jersey.



HAZARD
insulated cables

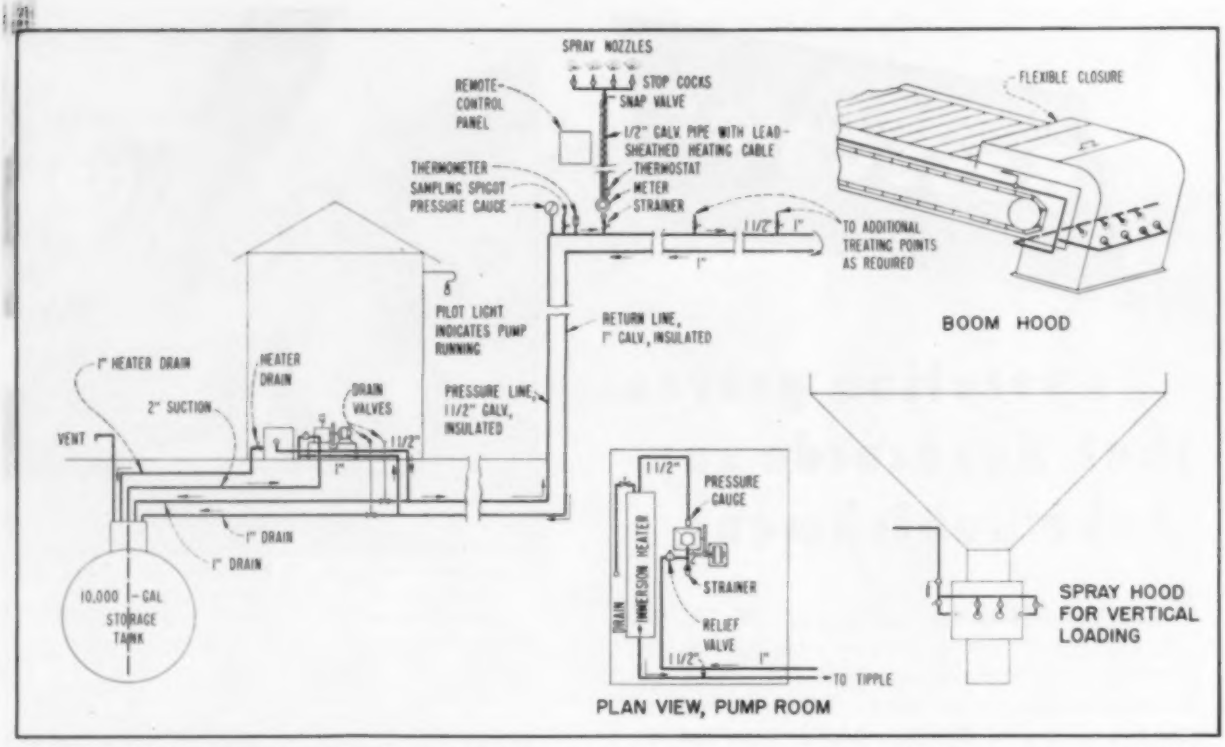
PRODUCT OF OKONITE RESEARCH

2445

Overall shielding on this Hazacord high voltage cable reduces hazards of shock to men who come in contact with the cable during operation.

Hazacords are known for their reliability in blasting operations such as this where there is constant threat from impact and sharp uneven surfaces.

Hazacords give long service even when dragged continuously over rough, destructive terrain like that shown here.



TYPICAL HOT-OIL SYSTEM includes storage tank, oil heater, pump, pipe lines and hoods at points of application.

Tips on Oil-Treating Coal

DUSTPROOFING AND FREEZE-PROOFING coal are receiving more and more attention in today's highly competitive markets. Contributing to the increased interest are: (1) the many new washing facilities that increase the freeze-proofing problem both in transit and in storage; and (2) the demand for a dust-less coal by domestic and industrial customers. If you are considering adding an oil system, this information may help.

WHAT TYPE OF SYSTEM?

Effective treatment of coal is possible with both hot-oil and cold-oil high-pressure systems. Oils can be selected to atomize in either system—the important thing is to break it down fine for good coverage.

In a hot system, oil is heated to temperatures between 150 and 200 deg F and sprayed at pressures up to 150 psi at the nozzles. The cold high-pressure system uses pressures between 250 and 500 psi at the nozzles, depending on the temperature and viscosity of the oil. The cost of treating with hot or cold oil is about the same.

Although simple equipment is used for treating coal with oil, it must be designed properly. Components of a system include a storage tank with a minimum capacity of 10,000 gal, motor, oil pump, circulating lines and unloading line to storage tank, control valves, flow meters, filters, strainers, nozzles and spray hoods. If a hot system is desired, heating units must be added to the equipment. You can buy the system as a package unit or design and assemble your own.

The cost will depend on the size and refinements desired, but will probably range from $2,000 to $6,000. The lower figure would pay for equipment capable of treating about 50 tph. If you anticipate treating only minor quantities, a portable unit can be purchased for less than $500. Small quantities of oil can be bought in 55-gal drums, but price per gallon would be nearly double that of tank-car quantities.

HOW TO APPLY OIL

Oil should be applied where the coal is tumbling or in suspension. The most effective place is at the end of the loading boom or chute as the coal is being loaded into the railroad car. A hood should be built to confine the atomized oil to the coal. Nozzles should be located and adjusted so each piece of coal will be covered with a very thin film of oil. When the flow of coal is heavy, baffles or riffles should be installed to break up the flow and permit the oil to coat the coal.

The effectiveness of a spray pattern can be tested very easily. By mixing 2x4-in pieces of paper with the coal before it is treated and then examining them after passing through the sprays, effectiveness can be checked. The pieces of paper should be uniformly spotted with oil.

Visual inspection by an experienced preparation engineer also is helpful in determining the effectiveness of oil spraying. Several hours after treatment, the coal will have a uniform appearance if treated properly. Any water dripping from cars should be free of oil film.

HOW TO FREEZEPROOF COAL

The same quantity of oil used for dust-proofing generally also will freezeproof the coal. Sometimes when freezeproofing alone is desired, the quantity of oil needed will range from 1 to 3 qt per ton. This will depend upon the size and the moisture content.

HOW MUCH OIL TO USE?

The quantity of oil needed to treat a particular coal can be determined only by a study of the analysis of the coal and the customer's needs. For example, if a coal is to be stored for some months, enough oil should be applied to maintain dustproofing until the coal is used. If a coal is friable and breaks up during transit, more oil will be needed than for a hard, strong coal.

The quantity of oil used per car of coal is the accepted method of recording the application of oil. However, this does not tell how well the treating is done. It is a mistake to measure all the oil taken from storage during a shift and then assume that each car received an equal quantity. Flow meters should be installed at each point of application to record the exact quantity applied to each car.

Most of the coals in the eastern United States require 3 to 4 qt of oil per ton of stoker coal and 2 to 3 qt per ton of egg and lump. Midwestern coals are more porous and therefore require from 1 to 3 gal per ton. Each coal must be studied individually and treating standards established accordingly.

Typical working view of a MARION 5323.

BIG MARION on way to Brazilian Coal Mine

A MARION 5323, 18 cubic yard stripping shovel, is on its way to a coal mine in Brazil.

One of the largest excavators in South America, it weighs 1,735,000 pounds. It required 33 rail cars to ship to an eastern port.

The 5323 can move three times its own weight in two hours of digging. The coal it will help produce is expected to hasten the development of the steel industry in Brazil.

There is a MARION stripping machine or coal loader for every open pit requirement. See your nearest MARION District Office.

MARION • OSGOOD • GENERAL

MARION POWER SHOVEL CO. • MARION, OHIO, U. S. A.

A Subsidiary of Merritt-Chapman & Scott Corporation

POWER SHOVELS FROM ½ TO 60 CUBIC YARDS
PILE DRIVERS • WALKING DRAGLINES

DRAGLINES • CLAMSHELLS • CRANES • BACKHOES
TRUCK CRANES • MOBILCRANES • LOG LOADERS

Your Confidence Is Justified Where This Flag Flies

NEWS ROUND-UP

Pitt Consol in Aluminum Plant; Sets Pipe-Line Coal Delivery

PLANS FOR PARTICIPATION by Pittsburgh Consolidation Coal Co. in construction of an $85-million primary aluminum plant and signing of a contract for delivery via an 108-mi pipe line of 18 million tons of coal over the next 15 yr were reported last month.

A spokesman for the Office of Defense Mobilization disclosed May 25 that Pittsburgh Consol and the St. Joseph Lead Co. had applied jointly May 16 for a "certificate of necessity" for a 5-yr write-off for federal tax purposes on much of the estimated $84,961,000 cost of the proposed plant. No details of the companies' plans were released, but the investment involved would indicate a plant with an annual capacity of 50,000 to 60,000 tons of ingot aluminum. Participation by Pittsburgh Consol points to location of the plant in a coal-producing area.

According to reports, action on the application was expected within a short time and it seemed likely that the certificate would be issued since ODM Director Arthur S. Flemming had revealed the week previously that the agency was considering revival of the long-debated "third round" of aluminum expansion because of current shortages. It also was pointed out that a plant using steam-generated power proposed for the Ohio Valley was one of the projects dropped when the "third round" was abandoned earlier.

Signing of the contract for delivery of coal by pipe line from Pittsburgh Consol's Georgetown, Ohio, properties to the Eastlake, Ohio, plant of the Cleveland Illuminating Co. was jointly announced May 31 by George H. Love and Elmer L. Lindseth, president of the coal company and utility, respectively.

Under development by Pittsburgh Consol for several years, the project will be the first commercial coal pipe line in the United States. It is being constructed with the complete cooperation of the two railroads serving the mine and the one railroad on which the utility is located, Mr. Love reported. The N. Y. Central R.R., the N. Y., Chicago & St. Louis R.R. and the Pennsylvania R.R. are participating with the coal company and are in a position to take a substantial ownership in this new means of coal transportation when construction is completed, he said. The Georgetown property will continue to ship most of its production by rail, it was stated.

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News Briefs and Trends

Kaiser Steel Negotiates For Huge N. M. Coal Tract

Kaiser Steel Corp., Oakland, Calif., has been granted an option by the St. Louis, Rocky Mountain & Pacific Co. to purchase all of its real estate and mining facilities in Colfax County, New Mexico, according to an announcement by E. T. Springer, Rocky Mountain president. Included are 202,000 acres of lands in fee simple and about 326,000 acres of coal rights. The Kaiser Corp. must exercise the option to purchase by Aug. 1. Official proven reserves of the property are said to total 5 billion tons "excellent" for coking purposes. Kaiser's mills are at Fontana, Calif.

N&W to Lease Colliery

The Norfolk & Western Ry. announced May 30 that it expected to lease its Pond Creek Colliery, Williamson, W. Va., to the Osborne Coal Mining Corp. The mining company will add a cleaning plant at Goody, Ky., and produce both commercial and locomotive coals, it was said. In announcing curtailment of operations at Pond Creek Colliery last fall, the N&W reported that it was planning to withdraw from production of locomotive fuel.

Bituminous Still Moving Up

Bituminous production in May continued to add to its 1955 gains, according to USBM estimates. Output through May 21, 1955, totaled 170,756,000 tons, an increase of 17.1% over the 145,882,000 tons produced in the comparable period of 1954. A month previously, through April 23, the year's output was 14.8% ahead of 1954. Production during the week ending May 21 was 9,250,000 tons, some 385,000 tons more than the previous week and over 2 million tons ahead of the comparable week in 1954. Anthracite through May 21 totaled 9,603,000 tons, down 8.6% from 1954. Through April 23, it had been 9.9% under 1954.

Reynolds Acquiring Coal

The Reynolds Metals Co., Richmond, Va., has announced discovery of a 176-ft thick coal vein in the Lake De Smet

50% Steel Growth Seen in 15 Yr

An average increase in U. S. steelmaking capacity "of about 4,000,000 tons a year over the next decade and a half," was predicted by Arthur B. Homer, president of the Bethlehem Steel Corp., speaking at the 63rd general meeting of the American Iron & Steel Institute in New York last month. The increase of some 60 million tons of capacity during the next 15 yr would represent a boost of almost 50% over the industry's present capacity of 128,000,000 tons.

Mr. Homer's forecast was seconded by Max D. Howell, executive vice president of the institute, who said that "for this industry the future is bright indeed." Both speakers pointed to the expected population growth, expanding economy and increasing per capita consumption of steel as factors that will make expansion of the steel industry imperative. "If the projections for the economy as a whole are realized," Mr. Howell said, "the steel industry will need an ingot capacity of about 185,000,000 tons in 15 yr to handle peak requirements."

The election of Benjamin F. Fairless as president of the institute was announced at the closing dinner. Mr. Fairless, who retired this spring as chairman of the U. S. Steel Corp., becomes the eighth president in the institute's 47 yr and will act as the industry's official spokesman and leader.

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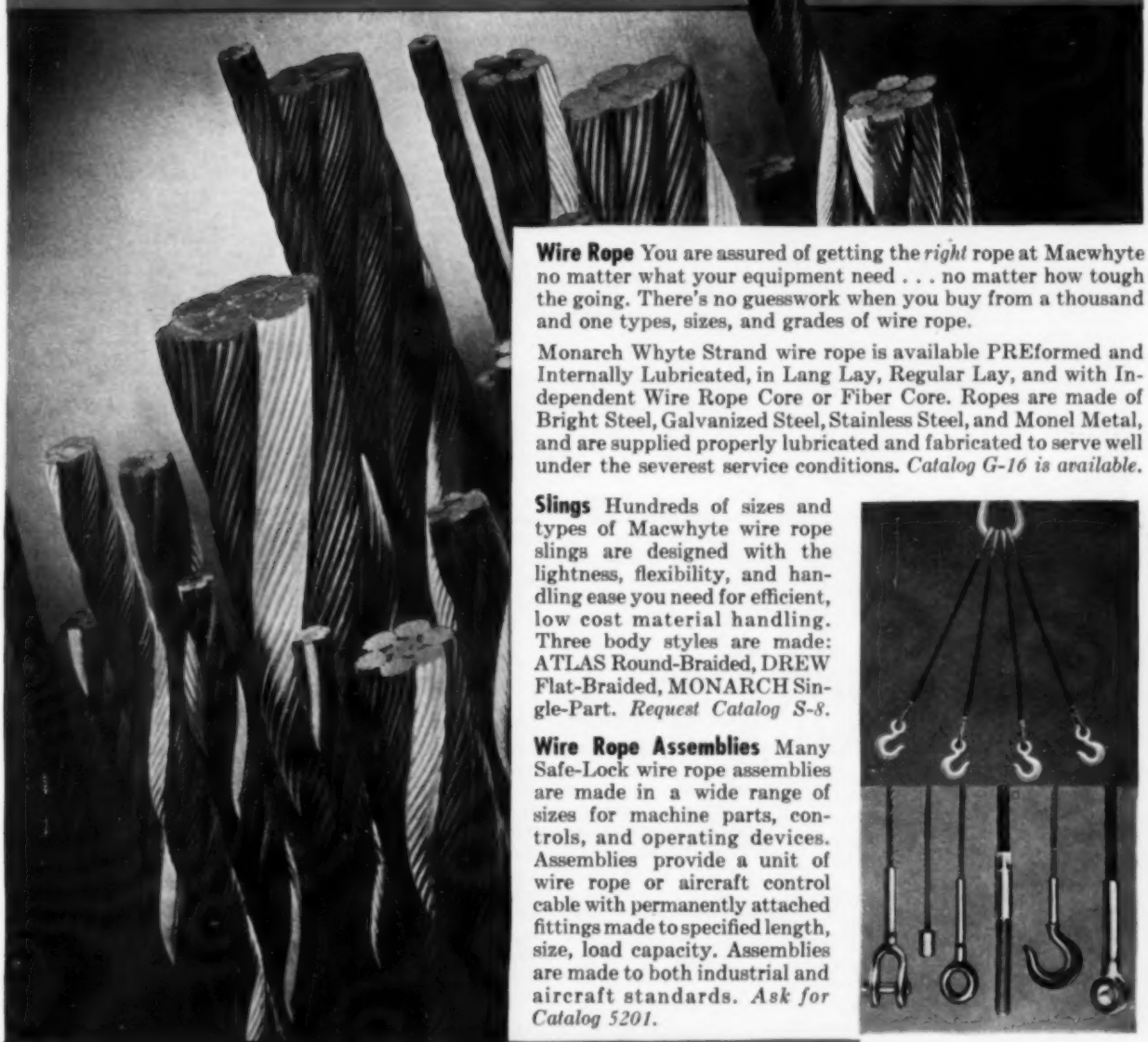

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area, Wyoming. It is believed to be the second richest coal vein in the world, exceeded possibly by one in Manchuria. The company also announced that it was considering building two new plants—one in Wyoming and another in Kentucky. Richard S. Reynolds, Jr., president of the company, told stockholders that the firm had acquired acreage in Kentucky with proven coal reserves reportedly estimated at 100 million tons, and had taken an option on properties in the Lake De Smet area. On May 12 the Wyoming land board approved leases for Reynolds Metals on some 14,000 acres of state land adjacent to private properties on which it has options.

EG&FA Childrens' Camps To Mark 20th Yr.

This summer will mark the 20th anniversary of annual summer recreation camps for children of mine workers employed by the Coal and Stores Div., Eastern Gas & Fuel Associates, Pittsburgh, Pa. During 20 yr, the camps have brought mind- and body-building recreation to nearly 15,000 children between the ages of 8½ and 14 yr. Two summer camps are now operated—Camp Lightfoot, near Hinton, W. Va., for white children, and Camp Washington Carver, Clifftop, W. Va., for negro children. Parents of each child pay $10 for 2 wks at the camp which includes food and housing the supervision and protection of trained counsellors, and private bus transportation from their home communities to the camp and return. Camp Lightfoot has a capacity of 180 campers during each of four 2-wk camping periods. Camp Washington Carver provides facilities for 145 campers during one 2-wk camping period.

Glen Alden Buys Texas Firm

As the first step in a diversification program to stabilize its mining operations, the Glen Alden Corp. has purchased the Mathes Co., Fort Worth, Tex., manufacturers of heat pumps, air conditioners and room coolers. The Mathes Co. expects 1955 sales totaling about $20,000,000, with earnings, before taxes, of about $3,000,000, Glen Alden president, Francis O. Case, said in making the announcement at the company's annual meeting. To accommodate this expansion as well as other anticipated diversifications, the stockholders voted approval of a change in the name of the Glen Alden Coal Co. to the Glen Alden Corp.

Labor Dept. Bars Mines

On April 28 Secretary of Labor James P. Mitchell barred six small Tennessee coal mines and two dealers from further government contracts because of failure to maintain safety and sanitation standards. The listing was to become final in 20 days unless a successful appeal was made to Mr. Mitchell. The action was taken under provisions of the Walsh-Healy Public Contracts Act. It was the first time the 1936 act has been used to enforce safety in coal mines, Labor Department officials said. The order was based on investigations and hearings last year when the two dealers farmed out government contracts totaling $1,264,640 to the six mines.

MEETINGS

Indiana Coal Mining Institute: Meeting, June 11, Terre Haute House, Terre Haute, Ind.

American Retail Coal Association: 20th Annual Anniversary Convention, June 14-15, Congress Hotel, Chicago.

American Coal Sales Association: Annual Convention, June 23-26, Greenbrier Hotel, White Sulphur Springs, W. Va.

West Virginia Coal Mining Institute: Spring Meeting, June 24-25, Daniel Boone Hotel, Charleston, W. Va.

Rocky Mountain Coal Mining Institute: 51st Annual Meeting, June 26-29, Colorado Hotel, Glenwood Springs, Colo.

Germany Imports Additional Four Million Tons U. S. Coal

Germany has placed orders with U. S. coal mines for 4 million tons of coal, according to a report in "Frankfurter Allgemeine Zeitung," one of Germany's leading newspapers. These orders are additional to previous ones for 600,000 tons filled during the first 3 mo of 1955. Due to high ocean freight rates, the report states, the German mills are paying considerably higher prices than for their own coal, but they are prepared to do so to maintain the increased output of the steel and other coal-consuming industries.

BCR Approves New Laboratory

The board of directors of Bituminous Coal Research, Inc., has authorized the establishment of bench-scale chemical and process laboratory facilities in the association's headquarters at 121 Meyran Ave. at Forbes St. Distinct advantages are seen for the operation of this type of research in Pittsburgh because that city is an important center for research by the coal and other industries. The board reports that the performance of the Columbus operation, the desire to expand BCR's activities in the chemical and process markets for coal, and operating economies made possible by the move, motivated its establishment of the new Pittsburgh laboratory.

P&R Explores Diversification

The Philadelphia & Reading Coal & Iron Co. is exploring possibilities of diversification, Edward G. Fox, company president, told stockholders at the annual meeting in May. "The objective of this diversification is the maximum benefits to the shareholders in the form of immediate return on their investments, plus reasonable and proper prospects for capital gains in the values of each individual shareholder's ownership of shares." Mr. Fox said that the company had "effectively bettered its operating position" by adopting last year a new operating policy based on a realistic appraisal of market potentialities. "In March of this year, for example, our production costs at deep mines had improved by almost 15% as compared with last October. Similarly, our production and preparation costs for coal from all sources were reduced substantially." Mr. Fox noted he had reported in February that the board was considering resumption of dividends in an amount related to earnings. But "for the first quarter of 1955 earnings from operations and sales do not justify such consideration."

New Coal Mine at Clay, Ky.

Poplar Ridge Coal Co., St. Louis, Mo., has reported that its mine at Sturgis, Ky., will be replaced by a new mine near Clay, Ky. The new mine will cost $6 million and will employ about 300 men, the same number now on the job at Sturgis. The Sturgis mine was opened in 1941 by the West Kentucky Coal Co., and was sold to Poplar Ridge about 8 yr later.

Two Kentucky Mines Re-Open

Two Kentucky properties shut down for some months were expected to resume operation around June 1, it was reported last month. The 1,500-tpd Clear Branch mine, Ligon, Ky., has been acquired by the Imperial Elkhorn Coal Co. and will be operated as the Guaranty No. 3 mine. The property contains some 10 to 15 million tons of Elkhorn No. 3 coal and ships via the C&O. Exclusive sales agents are the Guaranty Gas Coal Co. and Pickands Mather & Co. According to reports the Wayland (Ky.) mine of the Elk Horn Coal Corp., idle for almost a year, has been leased to the Evans Elkhorn Coal Co.

And For Your Information . . .

The Pennsylvania R.R. has reconditioned some 30 steam locomotives, retired when diesels took over, to provide the added motive power needed because of booming freight traffic. Eighteen are back on the mainline and the others are ready to go at a moment's notice.

Winner of the first aid contest at the All-Ohio Safety Congress held in Cleveland was the Midvale mine of the Columbia-Southern Chemical Corp., subsidiary of the Pittsburgh Plate Glass Co.

A long-term contract to supply about 1,500,000 tons of coking coal a year has been signed by the Pocahontas Fuel Co., Inc., with the Jones & Laughlin Steel Corp. In announcing the contract to stockholders, A. R. Matthews, Pocahontas Fuel president, pointed out that such arrangements stabilize operations and employment and justify large investment in more efficient production facilities.

Productivity of Yugoslav coal mines is to be increased with the help of American methods under a contract with the Government of Yugoslavia signed by Pierce Management, Inc. A team of eight practical operating men, headed by Henry A. Dierks, former Glen Alden general manager, left May 1 to start the project.

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Personal Notes

John S. Wells has been named manager of the High Volatile Div., Eastern Gas & Fuel Associates' Coal Div., succeeding the late W. D. Hawley. Mr. Wells, who will have headquarters at Glen White, W. Va., formerly was production engineer for the division. He joined EG&FA in 1930 as a mine worker and has held various supervisory positions at the company's properties. Before becoming production engineer, he was general superintendent of the Wharton, Koperston and Weeksbury mines and previously served as superintendent of the Wharton No. 1 and Maitland mines.

Fred Hall, associated for 13 yr with the Elk Horn Coal Corp., Wayland, Ky., was appointed assistant to the chief engineer, effective May 1, according to an announcement by N. D. Howard, chief engineer. Mr. Hall will cover Elk Horn Coal's properties in six counties in eastern Kentucky and two counties in northern West Virginia.

R. E. Johnson, formerly executive vice president, has been named administrative vice president of the Federal Coal Co., Charleston, W. Va.

C. Jess Asbury, superintendent, D.J.B. Collieries, Inc., Grundy, Va., has resigned because of ill health. Active in the coal industry for more than 40 yr, Mr. Asbury was for many years mine foreman for the Warrior Coal Co., War, W. Va., and also served as mine foreman for the H. E. Harman Coal Co. until joining D.J.B. Collieries in 1947.

Andrew Denari, with the firm since its organization in 1930, has been elected executive vice president of the Pittston Co., New York, according to an announcement May 25 by J. P. Routh, chairman and president. **Carlos Routh,** assistant secretary, was named secretary of the company, to succeed Mr. Denari.

The election of **Benjamin F. Fairless** to the board of directors of the Pittsburgh Consolidation Coal Co. was announced by the company May 16. Mr. Fairless retired at the end of April as chairman of the U. S. Steel Corp., after many years with the firm. Earlier, Pittsburgh Consol announced the retirement of **Frank R. Amos** as vice president and counsel. Mr. Amos had served as vice president since 1948 and previous to that was consulting counsel for the company in West Virginia. Mr .Amos will be associated with the law firm of Thorp, Reed & Armstrong, of Pittsburgh, and will act as associate counsel for Pittsburgh Consol. **John Corcoran,** assistant vice president since 1950, succeeds Mr. Amos as vice president and counsel.

George E. Enos, executive vice president, Enos Coal Mining Co., Cleveland, has been appointed the industry's representative on the Natural Resources Committee of the Chamber of Commerce of the United States, filling the post formerly held by A. L. Lynn, vice president, Island Creek Coal Co. **Dr. Ford K. Edwards,** director of the National Coal Association's department of coal economics, has been named a member of the Chamber's Business Statistics Committee.

John H. Cassells has been appointed general auditor and credit manager of the Princess Elkhorn Coal Co. and affiliated companies, Huntington, W. Va., according to an announcement by Russell Harman, vice president and controller. Mr. Cassells, who has been associated with a Huntington coal mining firm for the past 7 yr as secretary-treasurer, succeeds **John Sakakini,** who resigned to join a Huntington manufacturing company.

Spencer S. Shannon, of Bedford, Pa., was sworn in May 4 as director of the Office of Minerals Mobilization, U. S. Department of the Interior. The OMM, established in January, will carry out functions authorized by the Defense Act of 1950 in respect to strategic and critical metals and minerals, including solid fuels. Since 1939, Mr. Shannon has been active in private consulting work in mining and related fields and also has held various government posts. Previous to that date, he was associated for 20 yr with the Shannon Co., Dudley, Pa., and the Carbon Coal & Coke Co., Boston.

Eugene D. Gardner has retired as chief mining engineer of the U. S. Bureau of Mines after nearly 44 yr of government service. A holder of the AIME Jackling Award and the Distinguished Service Award and Gold Medal of the U. S. Department of the Interior, Mr. Gardner joined the government in June, 1911, as a mineral examiner for the U. S. Forest Service, transferring to the Bureau of Mines in 1918. Since that time, his duties have taken him to all parts of the United States and to many foreign countries, and he is the author of some 50 publications, including standard reference works, as well as numerous periodical articles. Mr. Gardner will continue to be available to the Bureau on a part-time consultant basis for work on special projects.

The appointment of **Dr. Robert H. Flinn** as chief of the Div. of Health of the U. S. Bureau of Mines was announced May 2 by Secretary of the Interior Douglas McKay. Dr. Flinn, who has been with the U. S. Public Health Service since 1931, is on a 2-yr detail from that service. As chief of the new division established last December as a part of the bureau's reorganization, Dr. Flinn will assist in formulating programs and basic policies and direct research with regard to health in the mineral industries.

The election of **William R. Dougan** as vice president (sales) by the board of directors of the Philadelphia & Reading Coal & Iron Co. has been announced by Edward G. Fox, president. Mr. Dougan succeeds **Clyde H. Stephens,** who retired May 31.

Charles F. Steck, for the past 9 yr electrical mine inspector for the Pennsylvania Department of Mines in the anthracite region, offers a new safety service to mines, strippings and quarries and government agencies. Mr. Steck has opened offices at 220 W. Sunbury St., Shamokin, Pa., from where he will work with the safety organizations of mining companies on a day basis or in a continuing program in a consulting and inspecting capacity. Mr. Steck is a graduate of Chicago Engineering Works training, and his experience includes 20 yr in electrical installation and maintenance in private industry.

Joins Consulting Firm

MISS SHIRLEY C. BARBER joined Robinson and Robinson, mining engineers, Charleston, W. Va., May 1 to specialize in industrial engineering. For 4 yr Miss Barber was an engineer in the Coal Div., Jones & Laughlin Steel Corp. She was recalled to the Navy to rewrite the Navy Department Marine Navigation Advanced Course II, which is currently in use. When released from active duty earlier this spring, she held the rank of Lieutenant Commander.

Preparation Facilities

Uniontown Coal Mining Co., Uniontown, Ky.—Contract closed with Deister Machine Co. for three coal-washing tables to handle 7/16x0; capacity, 45 tph.

Pond Creek Pocahontas Co., Pond Creek No. 6 mine, Bartley, W. Va.—Contract closed with Heyl & Patterson, Inc., for complete 140-tph ¼x0 fine-coal washing plant, including Deister tables, Reineveld centrifuge, vacuum filter, Raymond flash drier, and 14-, 8- and 3-in H&P cyclones.

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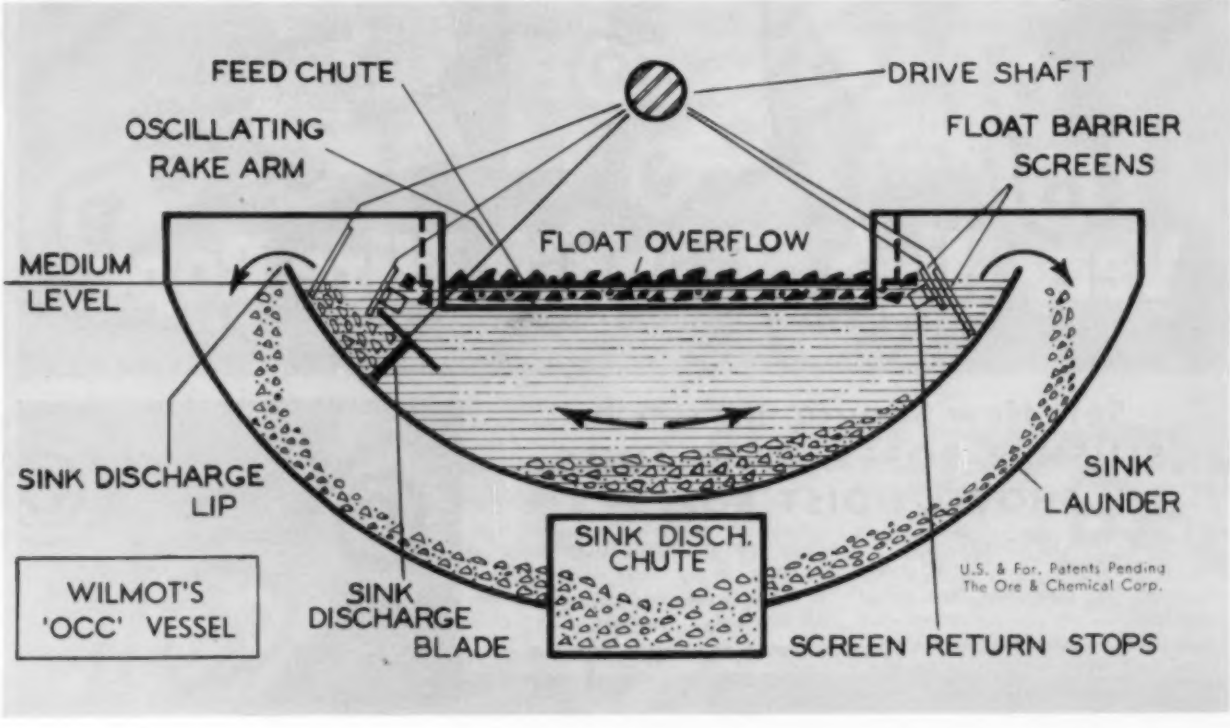

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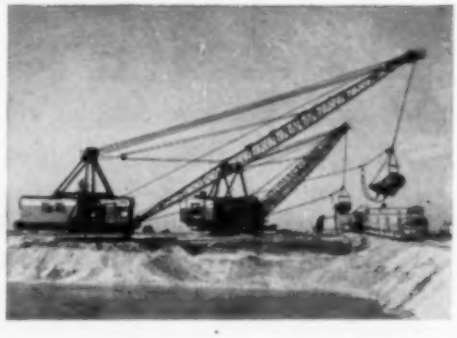

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Stonega Coke & Coal Co., Pine Branch, Va.—Contract closed with Heyl & Patterson, Inc., for water-clarification, recovery and refuse-handling system for 50 tph of ¼x0 fine coal, including 5-disc 6-ft vacuum filter, 14- and 3-in cyclones and accessories, 6x16-ft dewatering screen, auxiliary screen and conveyors and Reineveld centrifuge.

Coiltown Mining Co., Madisonville, Ky.—Contract closed with Heyl & Patterson, Inc., for water-clarification and recovery system to handle 10 tph of 28Mx0 coal, including cyclones and accessories, dewatering screen and H&P trash screen.

Joanne Coal Co., Joanne mine, Rachel, W. Va.—Shipment by Deister Concentrator Co. of 14 SuperDuty Diagonal-Deck coal-washing tables for cleaning ¼x0 fraction and two Model 108 Concenco revolving feed distributors to provide feed distribution to the 14 tables.

Elk River Coal & Lumber Co., Widen, W. Va.—Contract closed with the Daniels Co., Contractors, Inc., for a complete DMS dense-media coal washery to wash 2,000 tpd of 8x⅛ coal, as addition to present washery facilities.

Weyanoke Coal & Coke Co., Arista, W. Va.—Contract closed with the Daniels Co., Contractors, Inc., for complete DMS dense-media coal washery to process approximately 300 tph of 6x¼ Pocahontas seam coal.

Big Ten Coal Co., Indianapolis, Ind.—Contract closed with the Daniels Co., Contractors, Inc., for complete new washer and tipple, including DMS dense-media coal washery to wash approximately 225 tph of 6x⅛ coal.

Obituaries

I. W. Rouzer, president of the Alabama Mining Institute, Birmingham, Ala., died April 23. Associated with railroad and coal industries since 1910, Mr. Rouzer was widely known throughout the area. He had headed the institute for the past 20 yr, representing all mining interests in Alabama.

John H. Harvey Sr., 64, a partner in the Greenwood Mining Co. for the past 15 yr, died April 24 in the Moses Taylor Hospital, Scranton, Pa. Long active in the anthracite region, Mr. Harvey started to work in the mines at the age of 9 yr and became superintendent for the Penn Anthracite Collieries before his association with Greenwood Mining.

Henry O. Stevens, 71, died April 27 in Garrison, N. D. His varied career covered business activities in railroad, irrigation, highway and public works contracting and coal mining, as senior member of Stevens Bros. Contractors & Coal Co., Stevens Bros., Ltd., and Foundation, Inc., of St. Paul, Minn., Winnipeg, Man., New Orleans, La., and Garrison, N. D.

Angelo Franciose, 65, of Montgomery, W. Va., president of the Imperial Coal & Construction Co., Rupert, W. Va., died May 13, following a heart attack suffered while en route to his home.

Association Activities

Ohio Coal Association Elects Sampson, Moves Offices

The Ohio Coal Association has elected Ford Sampson executive secretary. Mr. Sampson will continue as labor commissioner for the association and also as secretary of the Safety Directors' Organization of Ohio deep and strip mines. Effective June 1, the association's offices were to be moved from Cleveland to 15-16 Heinlein Bldg., Bridgeport, Ohio. Earlier, the association had announced the reorganization and expansion of its research activities, as reported below.

Somerset Operators Re-Elect

The Somerset County Coal Operators' Association, Somerset, Pa., at its annual reorganization meeting, re-elected Martin L. Markel secretary and commissioner for his 23rd consecutive term. Officers re-elected included Marlin J. Weber, president; John M. Dovey, vice president, and C. B. Berkey Jr., treasurer.

DuBois Elected President

B. M. DuBois, Clearfield, Pa., has been elected president of the Central Pennsylvania Open Pit Mining Association to serve the unexpired term of John H. Wallin, recently deceased. Robert Bailey, Morrisdale, Pa., has been elected vice president of the association.

Ohio Research and Fuel Engineering Unit Expands

The Research and Fuel Engineering Div., Ohio Coal Association, has been expanded and will no longer operate as a direct function of the association. It will be conducted under the name of the Research and Fuel Engineering Bureau of Ohio with offices in the NBC Bldg., Cleveland. E. D. Benton will continue as director of the research and fuel engineering activity. The new bureau will be supported by producing and selling companies in Ohio and the Panhandle district of West Virginia. Listed on the 1955-56 program are such projects and activities as new plant consultation, coal application studies, on-the-job fuel engineering service, an automatic coal-fired package boiler—a BCR project, active interest in the Coal Producers Committee for Smoke Abatement and in the Air Pollution Control Association, a sales engineering school for salesmen, and speaking engagements before various organizations directly or indirectly interested in coal application and utilization.

Mid-State Coal Mining Installs New Officers

Mid-State Coal Mining Institute has installed the following new officers: president, J. G. McCurry, general manager, Imperial Smokeless Coal Co.; first vice president, Joe L. McQuade, general superintendent, Maust Coal & Coke Co.; second vice president, S. D. Brady Jr., consulting engineer, Gauley Co.; third vice president, Robert Kamm, superintendent, Peters Creek Coal Co.; fourth vice president, Don H. Curtin, assistant general manager, Pardee & Curtin Coal Co.; fifth vice president, J. B. Bennett, superintendent, Woolridge Co.; and secretary and treasurer, William B. Goff, Gauley Co.

Coal Group Names Bullard

Fred B. Bullard, publisher of the Hazard *Herald*, Hazard, Ky., has been appointed executive secretary of the Hazard Coal Operators Association, it was announced by Finley H. Davis, president. Mr. Bullard will succeed William B. Sturgill, who resigned the position in February to become the executive presi-

COAL MEN ON THE JOB . . .

DURING INSTALLATION of officers of the Appalachian Chapter of Professional Engineers at Beckley, W. Va., participants in the ceremonies were: Ennis Naeve (left) private engineering; Robert Davis, private engineering; B. B. Corker, electrical engineer, Appalachian Electric Power Co.; Paul Feigley, private engineering; Lloyd G. Fitzgerald mining engineer, USBM; and Tom Howard, mining engineer, New River Coal Co.

Dominion Coal Colliery Canadian Safety Leader

WINNER of the 1954 John T. Ryan Trophy for top coal mine safety record in Canada was the No. 18 colliery of the Dominion Coal Co., Ltd., New Waterford, N. S. It was the fourth successive year in which the No. 18 colliery had received the award, thus retaining for Dosco collieries the distinction of having won the Dominion-wide trophy in all but one of the competition years. Shown at the presentation ceremonies at the annual meeting in Toronto of the Canadian Institute of Mining and Metallurgy, sponsor of the award, are: Angus D. Campbell (left), chairman of the institute's John T. Ryan Trophy Committee, and S. C. Mifflen, technical assistant, Dominion Coal, as C. C. Huston, retiring institute president, looks on. The No. 18 colliery also was the winner of the trophy for the Maritime regional competition. Other regional leaders were: for the Prairie Provinces, Western Crown mine, Amalgamated Coals, Ltd., Drumheller, Alta.; and for British Columbia, Michel colliery, Crow's Nest Pass Coal Co., Ltd., Fernie, B. C.

dent of the Columbus Mining Sales Co., Columbus, Ohio. Before Mr. Bullard's appointment, the association had announced that Tom Crutchfield would assume the post on April 1. However, Mr. Crutchfield decided to continue his association with Lee Crutchfield, Inc., local Chevrolet and Cadillac agency, and withdrew his acceptance of the coal position.

Central Pa. Safety Elects

Dennis J. Keenan, general superintendent, Sterling Coal Co., Bakerton, Pa., has been elected president of the Central Pennsylvania Safety Association for the seventh consecutive term. Other officers retained include Clyde H. Maize, vice president; Joseph C. Leonard, treasurer; and George Resick, secretary.

Roof Falls Still Cause Most Fatalities

Roof falls caused 174 of the 333 fatalities in the Nation's coal mines in 1954, and 61 of the 111 fatalities in the first quarter of 1955. The percentage of roof-fall fatalities among total fatalities continues to hover between 50 and 60%. Little progress has been made in reducing the proportion of deaths from roof falls, although the number of such accidents has been reduced.

In reporting the figures, the U. S. Bureau of Mines cited the principal causes of roof-fall fatalities in 1954 as follows:

1. Failure to correct known hazardous conditions—31 fatalities.
2. Failure to follow minimum standards of timbering—28 fatalities.
3. Failure to use sufficient temporary support at face—28 fatalities.
4. Failure to detect hazardous roof or ribs—18 fatalities.
5. Failure to provide adequate temporary support before removing timber supports—10 fatalities.

The USBM scores 161 roof-fall fatalities in 1954 as attributable to human failure, with only 13 caused by unavoidable risks or dangers that could not have been foreseen.

Of the 61 roof-fall fatalities in the first quarter of 1955, 50 occurred in bituminous mines and 11 in anthracite. Total underground deaths in this period were 79 bituminous, 14 anthracite.

"Despite a nationwide campaign begun early this year to combat this menace, both the number of roof-fall deaths and the roof-fall fatality rate are higher for the first 3 mo of 1955 than for the corresponding period last year," J. J. Forbes, director, USBM, declared, in pointing out that roof falls still are the coal miner's greatest nemesis.

New Coal-Burning System Created for Space Heating

A "revolutionary" space heating system for processing, delivering, carbureting and burning coal in suspension, the same as gas or oil, has been announced by its inventor, Stephen L. Fitzpatrick, Detroit, Mich.

Secret of the "BloKolGas System" is a special carburetor based on the same operating principle as the carburetor in an automobile, reports Mr. Fitzpatrick. This carburetor premixes finely powdered coal with exactly the correct amount of oxygen and the mixture is then blown under low pressure into the furnace.

In the furnace, the coal and oxygen mixture is ignited by a conventional pilot light. After ignition, the pilot automatically shuts off and the powdered coal continues burning. A thermostat controls the starting and stopping of the fire, always maintaining the desired temperature. Since the coal-and-oxygen mixture burns while floating in the air—each tiny particle of coal being surrounded by exactly the correct amount of oxygen—combustion is complete and without waste, Mr. Fitzpatrick says.

These advantages are claimed for the BloKolGas System: (1) It is safe—powdered coal will not burn unless separated into particles and properly mixed with oxygen; (2) it is quiet—the coal-and-oxygen mixture is blown into the furnace at a low rate of speed, thereby almost entirely eliminating flame noise; (3) it is smokeless—smoke is "burned," thereby providing an answer to smoke abatement ordinances and eliminating the cost of a furnace chimney in new buildings (only a small flue-gas outlet is required); and (4) it is economical—dollar-and-cent savings up to 50% can be made since the fuel itself is low in cost and is only burned when heat is needed.

Explaining the integrated BloKolGas System, Mr. Fitzpatrick says that a processing plant pulverizes the coal and reduces moisture content to a minimum of 1%. The processed coal is conveyed to specially designed delivery trucks which blow it through a hose line into customer storage tanks. Two types of storage tanks will be available: gravity feed, where headroom is sufficient; and mechanical feed, where limited.

Mr. Fitzpatrick says the carburetor feeder and ignition unit will be sold as a package with a specially designed steam or hot water boiler and hot air furnace or space heater. The feeder and ignition unit is also adaptable as a conversion unit to the conventional steam or hot water boiler and hot air furnace or space heater.

The BloKolGas System, Inc., has been organized by Mr. Fitzpatrick. He states that the first BloKolGas pulverized coal processing plant, together with its manufacturing, assembly and service plant will be located in that Pennsylvanuia city which is able to provide the necessary capital and labor force.

NEWSWORTHY ACTIVITIES of your company are interesting to other Coal Age readers, so tell us about them. Write The Editor, Coal Age, 330 W. 42nd St., New York 36, N. Y.

get-up-and-go POWER

... look here and see why!

Within the frame of this streamlined locomotive are two 190 HP motors . . . a pair of giant muscles to power Jeffrey's 27-ton four-wheel model.

These exceptionally large-capacity motors, each with ventilating blower, are ideal for the toughest and longest hauls because of high thermal capacity.

The largest four-wheel locomotive in coal mine use today, this unit has a rated drawbar pull of 13,500 pounds at speed of 10.8 MPH. Haulage on level track with clean, dry rail is 675 gross tons, without use of sand.

A long wheelbase, transverse equalizers, hydraulic snubber, and overall balanced design give an easy Pullman ride that motormen appreciate. It hugs the rails even on bad track.

Get mine locomotive catalog 836 by writing Mining Sales Division, Jeffrey Manufacturing Co., Columbus 16, Ohio.

OTHER FEATURES:

- Ten-step, straight parallel acceleration with full electro-pneumatic contactor control.
- Nine-step dynamic braking. Controller handle is turned clockwise from "off" for motoring and counter clockwise for dynamic braking.
- Straight air brakes, air sanders, air horn.
- Roller bearing journals and motor axle suspension.
- 32-volt battery operated control and headlights . . . both are effective even if power fails or trolley leaves wire.
- Automatic couplers.

DIMENSIONS:

Minimum track gauge	42"
Wheelbase	100"
Height (exclusive of trolley)	42"
Height (trolley locked down)	49"
Width (for 42-48" gauge track)	84"
Length (exclusive of couplers)	23'4"
Wheel diameter	36"

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MINING • CONVEYING • PROCESSING EQUIPMENT
TRANSMISSION MACHINERY • CONTRACT MANUFACTURING

PARTICIPATING in a certificate ceremony are: A. E. Cavalcante (left), president, Robena Local 6321; James Westfield, assistant director, health and welfare, USBM, presenting; J. C. Durfee, superintendent, Robena Washer; and Michael B. Girod, Robena superintendent, receiving. Mr. Cavalcante and Mr. Durfee also received certificates.

LOOKING OVER the program for the Robena mine safety day rally are James C. Gray (left) vice president, operations-coal, U. S. Steel Corp.; James Westfield, assistant director, health and welfare, USBM; Charles Ferguson, safety director, UMWA; J. V. McKenna, acting deputy secretary, Pennsylvania Department; and J. J. Forbes.

USS Mines Mark 100% Training

TOP EXECUTIVES of the U. S. Steel Corp., together with officials of the UMWA, USBM, and the Kentucky and Pennsylvania state mining departments, paid tribute in April safety-day rallies to miners and supervisors who had completed the 100% accident prevention course at the steel company's mines in the Frick district, Pennsylvania, and the Lynch district, Kentucky.

Honored April 30 in Uniontown, Pa., were 2,799 production and supervisory employees at the Frick district Robena mine. Over 3,000 spectators witnessed presentation of 100% training certificates to Robena mine and union officials. During the ceremonies, J. J. Forbes, USBM director, presented a certificate to W. R. Stedman, Frick district superintendent, to mark 100% training of mines and plants in the district, a total of 6,601 employees.

Over 2,000 spectators joined April 16 in celebrating the 100% safety training achievement in the Lynch 30-31 mine, 32 mine and outside. In congratulating the miners, T. E. Johnson, Lynch district superintendent, emphasized that the 100% attendance record of 1,784 employees could not have been accomplished without the complete interest and cooperation of everyone concerned. Among the company officials who received Bureau certificates were Mr. Johnson; Norman Yarborough, superintendent, Mine 30-31; E. H. Hollingsworth, superintendent, Mine 32; and C. E. Collins, outside foreman. All mine employees received pocket certificates and diplomas.

AT LYNCH RALLY, J. J. Forbes (left), director, USBM, presents a 100% accident prevention certificate to Litton J. Elliot, president, UMWA Local 7425.

Company Earning Reports

Pond Creek Pocahontas Co. and subsidiary—Quarter to March 31, 1955, net profit of $423,005, or $1.25 a share, compared with $218,342, or 64c a share during the first quarter, 1954.

West Virginia Coal & Coke Corp.—Quarter to March 31, 1955, income of $116,659, compared with a loss of $175,910 during the first quarter, 1954. Income from river operations totaled $377,234, against $111,998 in 1954. Income from coal operations (including loss from operations and sale of stores in 1955 of $91,603) resulted in a loss of $144,575, compared with a loss of $287,908 in 1954.

Lehigh Coal & Navigation Co.—Quarter to March 31, 1955, net income of $266,025, compared with a loss of $130,861 during the same period in 1954. President Dodson said the outlook for continued profitable operations is good. August, 1954, was the last month of losses from operations, he noted, and every month since that time has shown a favorable result.

Pittsburgh Consolidation Coal Co.—Quarter to March 31, 1955, net profit of $2,399,575, or $1.11 a share, compared with $2,244,864, or $1.04 a share in the same 1954 period.

West Kentucky Coal Co.—Quarter to March 31, 1955, net income of $159,383, or 19c a share, compared with $272,083, or 32c a share in the same period, 1954.

Philadelphia & Reading Coal & Iron Co. and subsidiaries—Quarter to March 31, 1955, net income of $392,385 (including special credit for reversal of reserves for mine fires), compared with a net loss of $929,834 during the first quarter, 1954.

Elk Horn Coal Corp.—Quarter to March 31, 1955, profit, before taxes, of $588,013, compared with a net loss of $256,323 during the first quarter, 1954. The 1955 figure includes gain of $657,659 on sale of coal land.

Independent Coal & Coke Co.—Quarter to March 31, 1955, profits, after income taxes, of $212,180, compared with profit of $22,474 for the 1954 quarter.

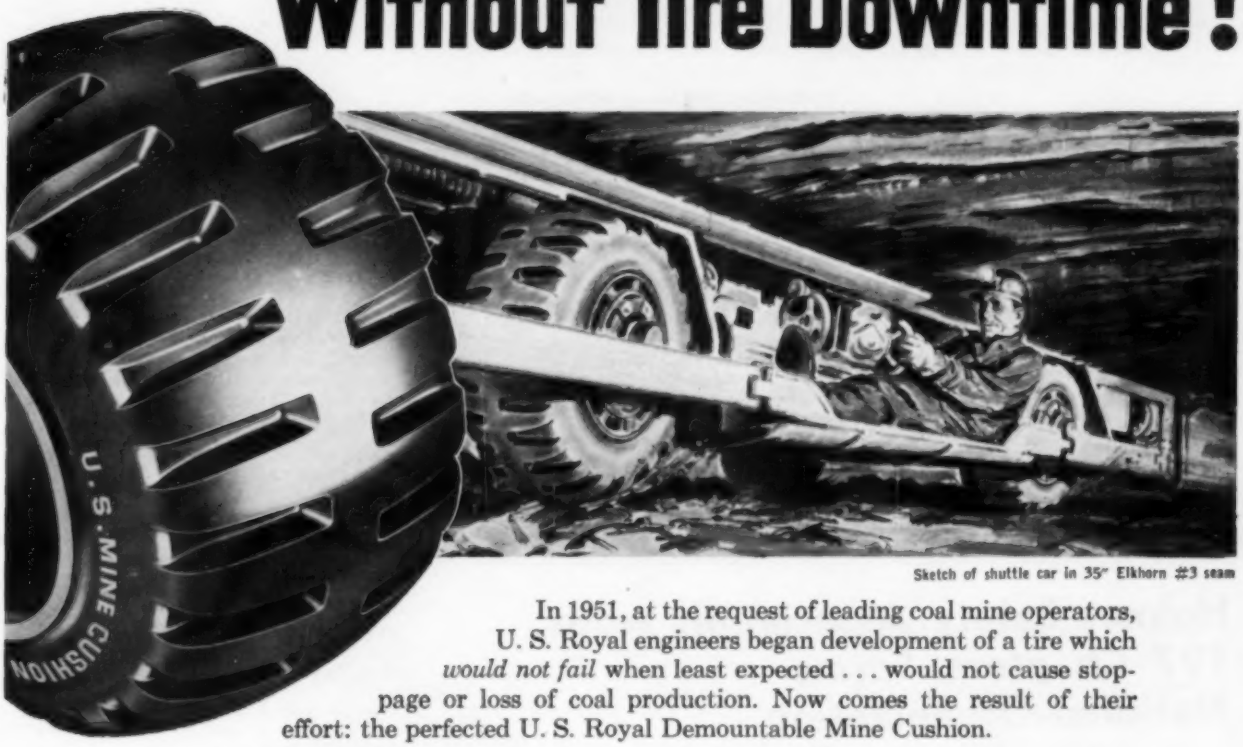
Pittston Co. and subsidiaries—Quarter to March 31, 1955, earnings, after preferred dividend, of $639,920, equal to 84c a share, compared with $414,952, or 55c a share, in the same 1954 period. Clinchfield Coal Corp., a subsidiary, plans to develop a new mine in Virginia to meet the increasing demands of the steel industry for coking coal.

Island Creek Coal Co. and subsidiaries—Quarter to March 31, 1955, net profit of $820,203, or 66c a share, compared with $292,621, or 21c a share during the same period, 1954.

Truax-Traer Coal Co. and subsidiaries—Fiscal year to April 30, 1955, consolidated net income of $2,228,415, or $1.71 a common share, on net sales of $45,628,632; compared to a net of $2,502,035, or $1.95 a share, on sales of $50,536,105 for the year ending April 30, 1954.

United States Rubber Company announces
the perfection of a new shuttle car tire.

2,000,000 Tons Mined Without Tire Downtime!



Sketch of shuttle car in 35" Elkhorn #3 seam

In 1951, at the request of leading coal mine operators, U. S. Royal engineers began development of a tire which *would not fail* when least expected . . . would not cause stoppage or loss of coal production. Now comes the result of their effort: the perfected U. S. Royal Demountable Mine Cushion.

How well these engineers succeeded is proved by the fact that in *three years* of grueling on-the-job tests, new U. S. Royal Mine Cushions have moved over two-million tons of coal without a single ton of production loss due to tire failure.

Only U.S. Royal Mine Cushion offers these exclusive features:

GREATER CAR CLEARANCE. Reduced overall diameter of the Mine Cushion generally permits greater car clearance in low-seam coal.

CUSHIONED RIDE. Thanks to U. S. Royal Mine Cushion's exclusive dual-stock construction of specially compounded rubber, ride characteristics are superior to tires in present use.

DOUBLES SERVICE LIFE. In exhaustive comparisons, the service life of U. S. Royal Mine Cushions averaged better than twice that of other tires used in shuttle-car service.

LESS DRAG, GREATER SPEEDS. U. S. Royal Mine Cushions have less rolling resistance, allow 25% higher vehicle speeds, boost production efficiency.

HIGHER LOAD CAPACITY. Load rating for 7.00-15 pneumatic is 4,350 lbs.; rating for U. S. Royal Mine Cushion of comparable size, 6,650 lbs.—an increase of over 50%!

EASY CONVERSION. Simple, bolt-on rim adapts to shuttle-car wheels. Unique demountable feature makes changing tire a matter of minutes.

U. S. Royal Demountable Mine Cushions cost no more. Find out how easily you can change over to these longer-lasting, trouble-free mining tires. Write Industrial Tire Department, UNITED STATES RUBBER COMPANY, Rockefeller Center, New York 20, New York.

NEW U.S. ROYAL Demountable MINE CUSHION

Holmes Awards Mark Safety Gains

FIVE COAL MINERS and one mine official were among the 14 recipients of Medals of Honor for heroism in saving life in the Nation's mineral industries awarded by the Joseph A. Holmes Safety Association at its annual meeting held in Washington April 26, according to the announcement by J. J. Forbes, USBM director and president of the association. R. G. Warncke, of the Bureau of Mines, was re-elected secretary of the organization.

Included in those receiving the 472 Certificates of Honor awarded for exceptional safety records and outstanding success in supervisory work, were 83 coal mines and companies, two mining associations and numerous mine officials and coal miners, as listed below.

The six winners of Medals of Honor for heroism were:

Robert M. Daugherty, cutting-machine operator for the Red Jacket Coal Corp., who endangered his own life to save those of three fellow miners after an explosion in the company's Wyoming (W. Va.) mine.

Joseph Carr, loading-machine operator for the Valley Camp Coal Co., Elm Grove, W. Va., who "displayed exceptional courage" by advancing under threatening mine roof to aid a fellow worker caught under fallen rock in the company's No. 3 mine.

Charles Antonelli and Stephen Marcovitch, former anthracite miners of Pottsville, Pa., who risked their lives to rescue two men from a slope in a small mine filled with deadly carbon monoxide fumes.

Richard Wells, roof-bolter, and **Nathan Fleming,** assistant mine foreman, who risked their lives to save a fellow worker who was caught by a fall of rock in the Wheelwright (Ky.) mine of the Inland Steel Co.

Certificates of Honor for exceptional safety records were awarded to the following coal mines and mining companies:

Alabama Power Co.: Gorgas No. 3 mine.
Amherst Coal Co.: Amherst IC and MacGregor No. 2 mines.
Armco Steel Corp.: Armco, Dorothy and Nellis mines.
Bell & Zoller Coal Co.: Murdock mine.
Bethlehem Mines Corp.: No. 41 mine.
Blue Diamond Coal Co.: Blue Diamond, Crown, Egan and Leatherwood mines.
Bowman Coal Co.: No. 2 mine.
Carmac Coal Co.: Carmac mine.
Citizens Coal Co.: East Breese mine.
Colorado Fuel & Iron Corp.: Allen, Frederick and Morley mines.
Columbia-Geneva Steel Div. of U. S. Steel Corp.: Columbia Coal mine.
Columbia-Southern Chemical Corp.: Midvale mine.
Consolidation Coal Co. (W. Va.): No. 63 and Williams mines.
Duquesne Light Co.: Harwick mine.
Eastern Gas & Fuel Associates: Federal No. 1, Keystone, Kopperston Nos. 1 and 2, Stotesbury No. 11 and Wharton No. 2 mines.
Hanna Coal Co.: Georgetown No. 12 mine.
Inland Steel Co.: Wheelwright mine.
Island Creek Coal Co.: General outside (Holden, W. Va.), Nos. 24, 25, 27 and 28 mines.
Jewell Ridge Coal Co.: No. 1 mine.
Joanne Coal Co.: Joanne mine.
Jones & Laughlin Steel Corp.: J&L Coal mines, Shannopin and Vesta Nos. 4 and 5 mines.
Knott Coal Corp.
Margo Coal Mining Co.: Davisburg mine.
Mid-Continent Coal Corp.: Green Diamond mine.
Midwest Radiant Corp.: No. 1 mine.
Moffat Coal Co.
Old Ben Coal Corp.: company supervising officials and No. 14 mine.
Pardee & Curtin Lumber Co.: Bergoo No. 4 mine.
Park Coal Co.: Park mine.
Peter White Coal Co.
Philadelphia & Reading Coal & Iron Co.: Locust Summit Central Breaker, Maple Hill, St. Nicholas Central Breaker, Shen-Penn Stripping and Wadesville Stripping mines.
Pond Creek Pocahontas Co.: Nos. 1, 3 and 6 mines.
Powhatan Mining Co.: Nos. 1 and 3 mines.
Red Jacket Coal Corp.: Coal Mountain Nos. 9 and 12, Keen Mountain and Mitchell Branch mines.
Republic Steel Corp.: Banning No. 3, Clyde, Indianola and Newfield mines.
Snow Hill Coal Corp.
Tennessee Coal & Iron Div. of U. S. Steel Corp.: Coal Mine Washers, Concord, Edgewater, Hamilton and Short Creek Coal mines.
Stonega Coke & Coal Co.: Roda No. 5, Imboden Colliery and Glenbrook High Splint No. 1 mines.
Truax-Traer Coal Co.: Burning Star Drift No. 2 mine.
Viking Coal Corp.: Viking mine.
West Virginia Mining & Consulting Co.: Kayjay mines.
Woodward Iron Co.: Dolomite No. 3 mine.

Certificates of Honor were awarded to the following mine officials for supervision of crews without a lost-time accident, except as otherwise noted, for the periods listed.

T. H. Bailey, general mine foreman, EG&FA, Kopperston, W. Va., Sept., 1943, to Dec. 31, 1954, and continuing, 257,372 man-hours.

Harry Ball, chief electrician, Republic Steel Corp., Russellton, Pa., for 1,666 days without a lost-time accident to crew and for working for 45 yr without a lost-time accident.

Clarence Bennett, tipple foreman, Pardee & Curtin Lumber Co., Bergoo, W. Va., Dec. 17, 1935, to Feb. 28, 1955, and continuing, 404,515 man-hours.

Joe Bensey, assistant foreman, Mine No. 41, Bethlehem Mines Corp., Barrackville, W. Va., without a fatality, March 11, 1942, to March 4, 1955, and continuing, producing 1,308,872 tons of coal. (Rec'd award 1954.)

John Biser, outside foreman, Indianola mine, Republic Steel Corp., Russellton, Pa.,

Holmes Safety Association Adds 197 Chapters, Forms National Organization

Organization of the Holmes Safety Association on a national basis for the first time has resulted from an intensive drive begun in April, 1954, to increase cooperation for mine safety, J. J. Forbes, USBM director and president of the association, announced May 4.

Established in 1926 to promote cooperation for mine safety among state and federal mining agencies and mine management and labor, the association has previously operated only on a local and district basis. However, during the past year 17 new district councils and 197 local chapters have been organized, and as a result of this increased interest the association has established a national council.

The rapid increase in membership resulted, Mr. Forbes said, from an all-out drive which the bureau sparked to extend the association. A specially trained 15-man team of federal coal mine inspectors has been working throughout the Nation during the past 12 mo to organize new chapters and councils. Growth of the association can be of great value in the fight for mine safety, according to Mr. Forbes, because experience has shown that wherever chapters and councils have been formed and remained active there has been a downward trend in accidents. The association now has chapters and district councils active in 12 states.

Officers of the new national council elected at the meeting of the association held in Washington April 26 are: president, Mr. Forbes, who is exofficio president of both the Holmes Safety Association and its parent organization, the Joseph A. Holmes Safety Association; first vice president, S. A. Magistrella, federal coal mine inspector and president of the Indiana (Pa.) council of the association; second vice president, L. J. Pnakovich, assistant to the president of District 31, UMWA, Fairmont, W. Va.; third vice president, Julius Olzer, acting chief of the West Virginia Department of Mines, Charleston, W. Va.; and secretary-treasurer, William Rachunis, Bureau of Mines mine safety representative, Washington.

Named executive-committee members were: Lou Evans, Pennsylvania Deputy Secretary of Mines, Bituminous Div.; Craig Patterson, safety director, Rochester & Pittsburgh Coal Co., Indiana, Pa.; Ralph McDade, president, Esso Chapter, Holmes Safety Association, Baton Rouge, La.; Clarence Carman, superintendent, EG&FA Coal Div., Stotesbury, W. Va.; and M. J. Ankeny, safety director, Bituminous Coal Operators' Association.

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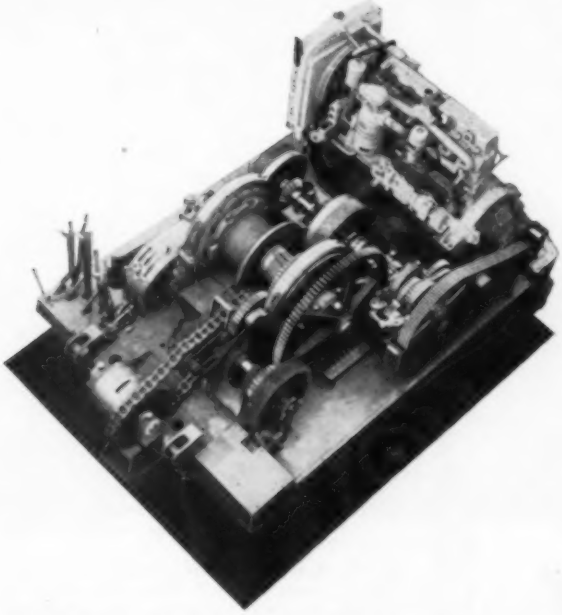
SPEEDS SERVICING IN YOUR PIT



Special care is taken to arrange deck machinery on Bucyrus-Erie excavators so it's easy to get at . . . so parts may be simply removed without dismantling other units.

Essential simplicity of design is one of many reasons Bucyrus-Erie excavators are preferred in the pits. It not only boosts output, but keeps maintenance low, machine-life long. One look at the deck machinery of a Bucyrus-Erie will show you how design simplicity makes a big difference in reducing maintenance delays. Parts are large, simple, few in number, easy to get at for replacing. Lubrication fittings are grouped at central, easily-accessible locations. All adjustments, including single-point wear adjustments on clutches and brakes, are easily made and stay put for long periods. Clutch bands are interchangeable and reversible end-for-end to simplify maintenance.

Design simplicity is only one of many Bucyrus-Erie features that add up to a higher percentage of actual working time each shift — and consequently to greater output and profits. Let your nearby Bucyrus-Erie distributor explain *all* of the features that make these machines standouts for output and economy in *your* loading and stripping operations. Ask about the 1½-cu. yd. 38-B (shown here), and about these other popular favorites for mining operations —the 2-yd. 51-B, the 2½-yd. 54-B, the 3-yd. 71-B, and the 4-yd. 88-B. 121E55

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75 Years of Service to Men Who Shape the Earth

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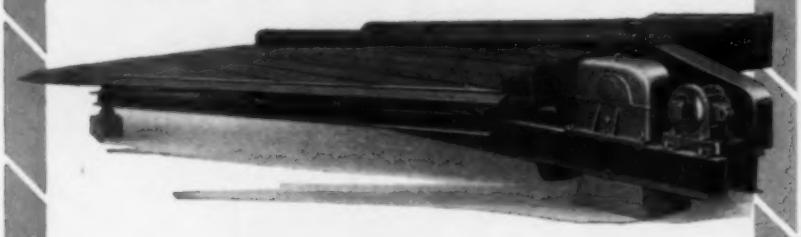
Insures Top Efficiency In Any Size Plant



It's a fact that the size of the plant makes no difference to the SuperDuty DIAGONAL-DECK® Coal Washing Table.

Operating singly or in battery, this efficient table delivers maximum tonnages of exceptionally clean coal with minimum loss to the refuse.

Its efficiency is attributed to (a) the DIAGONAL-DECK which unfailingly fans out the feed for the most positive separations (b) the smooth running head motion and (c) the factory aligned underconstruction. Its completely balanced, economical operation has won nation-wide acceptance in the most discerning circles of fine coal cleaning.

Send for Bulletin 119.

FOR SCREENING ECONOMY

All Leahy® screens provide differential vibration that snaps oversize wedging particles loose 1600 times per minute. When dust is a problem, totally enclosed models are available. For damp screening, FlexElex electric heating of the screen jacket insures full-time open mesh. For wet screening CONCENCO® spray nozzle arrangements are engineered for top efficiency.

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CONCENCO PRODUCTS

★ *The ORIGINAL Deister Company* ★ *Inc. 1906*

Feb. 12, 1947, to Dec. 31, 1954, 279,905 man-hours. (Rec'd award 1954.)

George Blake, tipple foreman, EG&FA, Helen, W. Va., May, 1941, to Dec. 31, 1954, and continuing, 245,232 man-hours.

M. R. Weaver, superintendent, Pardee & Curtin Lumber Co., Bergoo, W. Va., for no fatalities to the men in the No. 3, No. 5, and Bolair No. 1 mines, 4,534,910 man-hours, while producing 3,243,949 tons of coal.

J. W. Terpo, assistant mine foreman, Edgewater mine, TC&I Div., U. S. Steel Corp., Birmingham, Ala., Sept. 22, 1953, to Dec. 31, 1954, and continuing, 356,493 man-hours.

S. J. Bonds, track foreman, EG&FA, Stotesbury, W. Va., April, 1944, to Dec. 31, 1954, and continuing, 204,621 man-hours.

Leonard Busiere, mine foreman, Snow Hill Coal Corp., Terre Haute, Ind., for supervising the Green Valley mine without a fatality from June 16, 1951, to Jan. 1, 1955, 1,776,516 man-hours, while producing 2,544,690 tons of coal.

J. C. Crane, mine foreman, TC&I Div., U. S. Steel Corp., Birmingham, Ala., for supervising the Edgewater mine without a lost-time accident from Jan. 14, 1954, to Nov. 25, 1954, 553,138 man-hours.

Everett M. Curkendall, mine foreman, Bethlehem Mines Corp., Century, W. Va., for supervising mine No. 101 without a fatality from Nov. 16, 1942, to Dec. 31, 1954, 3,929,202 man-hours in the production of 3,243,380 tons of coal.

Marvin Dickens, assistant foreman, Armco Steel Corp., Montcoal, W. Va., for supervising a crew of 12 men in the Dorothy mine for 2,190 days without lost-time accidents.

Earl H. Dodrill, assistant foreman, Bethlehem Mines Corp., Barrackville, W. Va., for supervision of an underground crew in mine No. 44 without a fatality for 1,117,938 man-hours while producing 1,577,938 tons of coal. (Rec'd award 1954.)

Edgar J. Files, mine foreman, Concord mine, TC&I Div., U. S. Steel Corp., Ensley, Ala., Nov. 19, 1953, to March 21, 1954, 367,784 man-hours.

John Friend, mine foreman, Pardee & Curtin Lumber Co., Webster Springs, W. Va., for no fatalities under his supervision of Bolair mine No. 1 from Oct. 25, 1947, to Feb. 28, 1955, and continuing, 1,459,195 man-hours while producing 1,250,646 tons of coal.

Neil Gumbert, mine foreman, Republic Steel Corp., Indianola, Pa., May 3, 1949, to Dec. 31, 1954, 275,900 man-hours. (Rec'd award 1954.)

Herman Haase, cleaning plant foreman, Republic Steel Corp., Fredericktown, Pa., Feb. 1, 1949, to Dec. 31, 1954, 253,615 man-hours. (Rec'd award 1954.)

Harry Hasson, assistant mine foreman, Republic Steel Corp., Connellsville, Pa., Aug. 13, 1946, to Dec. 31, 1954, a total of 229,738 man-hours. (Rec'd award 1954.)

Willie Hayes, senior washer foreman, TC&I Div., U. S. Steel Corp., Birmingham, Ala., for no lost-time accidents under his supervision of four washing plants from July 31, 1953, to Dec. 31, 1954, and continuing, 438,593 man-hours.

W. H. Houts, washer foreman, TC&I Div., U. S. Steel Corp., Wylam, Ala., Dec. 16, 1942, to Dec. 31, 1954, and continuing, 350,933 man-hours.

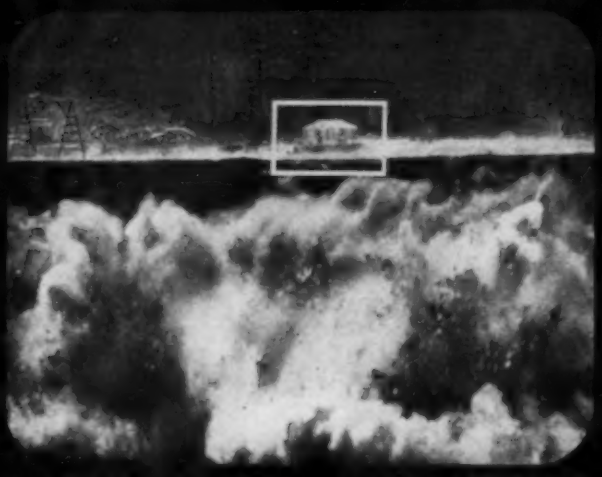
Ira Lacey, chief electrician, Republic Steel Corp., Indianola, Pa., Nov. 26, 1947, to Dec. 31, 1954, 250,115 man-hours. (Rec'd award 1954.)

J. V. Lemley, carpenter foreman, EG&FA, Grant Town, W. Va., Sept. 1936, to Dec. 31, 1954, and continuing, 348,432 man-hours.

William L. Loudermilk, outside foreman, EG&FA, Kimberly, W. Va., Nov. 1940, to Dec. 31, 1954, and continuing, 528,771 man-hours.

E. S. Myers, tipple foreman, Eastern Gas

COST-CUTTING MEMOS:



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EQUIPMENT APPROVALS

Seven approvals of permissible equipment were issued by the U. S. Bureau of Mines during April, as follows:

Joy Mfg. Co.—Type 3JCM-4F continuous miner; two 5-hp, three 7½-hp and two 65-hp motors; 500 v, DC; Approval 2-1049A; April 27.

Jeffrey Mfg. Co.—5-hp pump; 5-hp motor, 230 v DC; Approval 2-1054; April 5.

Long Co.—Joy Type 8BU-11G loader-Long PT Piggyback conveyor combination; one 15-hp and one 4-hp motor, 220 v AC; Approval 2-1055; April 8.

Joy Mfg. Co.—Type CD41 coal-drilling machine: 26-hp motor, 250 and 500 v DC; Approvals 2-1056 and 2-1056A; April 12.

Joy Mfg. Co.—Types 9SC2BPE-1 (modified by SBM-8601 or 5945) and 9SC2BPXE-1 (modified by SBM-8602) cable-reel shuttle cars; three 15-hp motors, 250 v DC; Approval 2-1057; April 14.

Goodman Mfg. Co.—Type 965B loader: two 15-hp and two 20-hp motors, 250 v DC; Approval 2-1058; April 25.

Mine Safety Appliances Co.—R-4 trip lamp; Approval 1028; April 19.

& Fuel Associates, Portage, Pa., Nov. 1944, to Dec. 31, 1954, and continuing, 276,822 man-hours.

John Narbut, chief electrician, Republic Steel Corp., Belle Vernon, Pa., Nov. 18, 1943, to Dec. 31, 1954, 531,200 man-hours. (Rec'd award 1954.)

T. D. Nutter, carpenter foreman, EG&FA, Keystone, W. Va., August 1944, to Dec. 31, 1954, and continuing, 220,738 man-hours.

Howard F. Oakley, assistant mine foreman, Rochester & Pittsburgh Coal Co., Indiana, Pa., Nov. 24, 1948, to Jan. 1, 1955, 247,882 man-hours.

Mike Sallock, mine foreman, Republic Steel Corp., Russellton, Pa., Nov. 28, 1948, to Dec. 31, 1954, and continuing, 239,904 man-hours. (Rec'd award 1954.)

A. M. Scott, foreman general maintenance, Short Creek mine, TC&I Div., U. S. Steel Corp., Birmingham, Ala., Jan. 1, 1952, to Sept. 6, 1954, a total of 250,479 man-hours.

Thomas Silcox, chief electrician, Newfield mine, Republic Steel Corp., Oakmont, Pa., Aug. 1, 1946, to Dec. 31, 1954, 229,512 man-hours. (Rec'd award 1954.)

R. H. Steading, mine foreman, TC&I Div., U. S. Steel Corp., Birmingham, Ala., for supervising the Concord mine without lost-time accidents, from Aug. 5, 1953, to March 21, 1954, 282,359 man-hours.

Certificates of Honor were granted to two organizations as follows:

Kiski Valley Council, Holmes Safety Association Leechburg, Pa., for no fatalities in any of its 13 mines for 4 yr, Jan. 1, 1951, to Jan. 1, 1955, 3,720,479 man-hours, with an average of 400 employees producing 3,611,728 tons of coal. (Rec'd award 1954.)

Kentucky River Mining Institute, Hazard, Ky., for no fatalities in its member mines during 1954, 2,549,268 man-hours while producing 3,792,279 tons of coal.

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The following individuals received Certificates of Honor for personal records of working in or around coal mines without a lost-time accident for the periods noted:

40 YEARS—Andrew Bodak, Hastings, Pa.; Nicholas Bukovac, CF&I Corp., Morley, Colo.; Stanley Cook, Armco Steel Corp., Montcoal, W. Va.; Rocco DeAngelis, CF&I Corp., Valdez, Colo.; Hobert Henderson, Armco Steel Corp., Dorothy, W. Va.; Henry Malloy, Bethlehem Mines Corp., Revloc, Pa.; Frank Mowery, Armco Steel Corp., Montcoal, W. Va.; H. O. Zimmerman, Inland Steel Co., Wheelwright, Ky.

41 YEARS—Nick Bonato, CF&I Corp., Morley, Colo.; John S. Bozich, CF&I Corp., Morley, Colo.; C. H. Hales, Park Coal Co., Leechburg, Pa.; Taulbee Johnson, Inland Steel Co., Wheelwright, Ky.; R. D. Mallory, Edgewater Mine. TC&I Div., U. S. Steel Corp., Birmingham, Ala.; Andrew Sabol, Hastings, Pa.; Lee Wallen, Inland Steel Co., Wheelwright, Ky.

42 YEARS—Rudolph J. Becker, Hastings, Pa.; G. P. Brown, TC&I Div., U. S. Steel Corp., Birmingham, Ala.; Joe DeBella, CF&I Corp., Valdez, Colo.; Frank Floyd Davis, EG&FA, Pineville, W. Va.; Pietro Lira, CF&I Corp., Valdez, Colo.; Angelo Ravazzini, North Apollo, Pa.

43 YEARS—Stanley Andrewlavage, Mildred Coal Co., Mildred, Pa.

44 YEARS—Pete Amodio, Inland Steel Co., Wheelwright, Ky.; Arthur Bradbury, Inland Steel Co., Wheelwright, Ky.; James Linelley, EG&FA, Oak Hill, W. Va.; Leonardo Pacheco, CF&I Corp., Morley, Colo.; August Vecellio, CF&I Corp., Valdez, Colo.

44½ YEARS—Jack Branham, EG&FA, Betsy Lane, Ky.; A. B. Sprouse, Armco Steel Corp., Montcoal, W. Va.

45 YEARS—Joseph Bochna, Republic Steel Corp., East Millsboro, Pa.; Marco Fran, Republic Steel Corp., Republic, Pa.; Mike Komar, Republic Steel Corp., Van Meter, Pa.; Mike Makel, Republic Steel Corp., Fredericktown, Pa.; Thomas McNulty, Republic Steel Corp., Fredericktown, Pa.; Harry Moore, Republic Steel Corp., Pricedale, Pa.; Robert Mullen, Republic Steel Corp., North Bessemer, Pa.; A. E. Oakley, Armco Steel Corp., Montcoal, W. Va.; Steve Operchalk, Republic Steel Corp., Jacobs Creek, Pa.; George Popish, Republic Steel Corp., Clarksville, Pa.; Alex Watson, Republic Steel Corp., Tarentum, Pa.; Cornie Long, Dunlap, Tenn.

46 YEARS—Joe Bargas, CF&I Corp., Valdez, Colo.; L. C. Bush, Republic Steel Corp., Uniontown, Pa.; Mike Onusko, Republic Steel Corp., Perryopolis, Pa.; George Risker, Republic Steel Corp., West Newton, Pa.; Harvey Leonard Tilley, EG&FA, Hatcher, W. Va.; W. A. Williams, Republic Steel Corp., Perryopolis, Pa.; Charles E. Levan, Whitwell, Tenn.

47 YEARS—George Bibby, Republic Steel Corp., West Newton, Pa.; Gus Carlson, CF&I Corp., Valdez, Colo.; J. C. Crawford, Apollo, Pa.; John McGreavey, Zeigler, Ill.; Dave Menapace, CF&I Corp., Valdez, Colo.; Henry Rosian, Hastings, Pa.; Martin Stopchuk, Republic Steel Corp., Russellton, Pa.

48 YEARS—Joe Falagrady, CF&I Corp., Valdez, Colo.; John Givener, Republic Steel Corp., Indianola, Pa.; Joseph J. Grandolsky, Republic Steel Corp., Clarksville, Pa.; Nicholas Kristolich, Republic Steel Corp., North Bessemer, Pa.; George Momberger, Republic Steel Corp., Russellton, Pa.; Alexander Rebres, Republic Steel Corp., Fredericktown, Pa.

49 YEARS—Fred Derrera, CF&I Corp., Valdez, Colo.; Herman Freiberg, Republic Steel Corp., Millsboro, Pa.; Joseph Gradosky, Jr., Republic Steel Corp., Cheswick, Pa.; Eugene R. Morris, Sr., EG&FA, Beards

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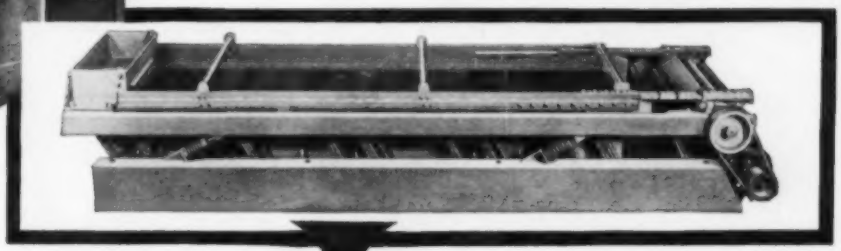

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Fork, W. Va.; Elmer Schrock, Republic Steel Corp., North Bessemer, Pa.; Luey Vitale, Republic Steel Corp., Indianola, Pa.; Lum Camp, Dunlap, Tenn.

50 YEARS—William D. Elkins, Whitwell, Tenn.; W. H. Jayne, Armco Steel Corp., Montcoal, W. Va.; Victor Pegoria, Republic Steel Corp., Smithton, Pa.; Howard Slacker, Republic Steel Corp., Grindstone, Pa.; John Vester Meeks, Tracy City, Tenn.

51 YEARS—James H. Austin, Republic Steel Corp., Millsboro, Pa.

52 YEARS—Adam Kaminsky, Republic Steel Corp., Republic, Pa.; Louis Nolan, Republic Steel Corp., Unity, Pa.

53 YEARS—L. R. Layne, Daus, Tenn.

55 YEARS—Russell McKinnon, Sr., Bethlehem Mines Div., Revloc, Pa.; George Stadjuhar, Sr., CF&I Corp., Morley, Colo.; Oliver Williams, Pardee & Curtin Lumber Co., Valley Bend, W. Va.

58 YEARS—Oliver Cope, Republic Steel Corp., Fayette City, Pa.; Fred Salvatori, CF&I Corp., Morley, Colo.

60 YEARS—David Walker, Hastings, Pa.

67 YEARS—Thomas Morgan, Somerset, Colo.

New Books for Coal Men

Contest Results

National First-Aid and Mine Rescue Contest, Fort Wayne, Ind., Sept, 29 and 30 and Oct. 1, 1953, by R. G. Warncke. Results of the National First-Aid and Mine Rescue contest, including rules for conducting the contest, method of judging and contest problems in both mine rescue and first-aid. *Information Circular 7710. 82pp; 8x10½-in; paper. Free, U. S. Bureau of Mines, Publication Distribution Section, 4800 Forbes St., Pittsburgh 13, Pa.*

Rock Handbook

Drillers Handbook on Rock, compiled and edited by Paul H. Nast, Rock Drill Div., Davey Compressor Co. This handbook is designed to give the rock driller a basic understanding of various types of rocks, their drillability and how to judge them before drilling. *68 pp; 6x9-in; paper. $1.50, Rock Drill Div., Davey Compressor Co., Kent, Ohio.*

Drainage Handbook

Handbook of Drainage and Construction Products, edited by W. H. Spindler, Market Development Div., Armco Steel Corp. A new edition of a comprehensive technical treatment of the design and engineering application of many widely used drainage and construction products. Designed to aid engineers in solving drainage problems and related engineering problems, the book also is helpful to engineering students. *592 pp; 6x9-in; cloth. $5, Armco Drainage & Metal Products, Inc., Middletown, Ohio.*

Other Books and Booklets

The Coal Industry in Europe is an 82-p analysis of the European coal industry for 1952, 1953 and 1954, including production, consumption, stocks, imports, exports and price. Short-term prospects and the factors which may

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affect the coal industry in 1955 also are discussed. Output and trade in lignite and separate analyses of production factors in the various coal-producing countries are covered in two appendixes. *6x9½-in; paper. $1, The Organisation for European Economic Co-operation, 2, Rue André-Pascal, Paris, France.*

Pipe Friction Manual is a revised reference developed by the Hydraulic Institute and represents the latest information available on pipe friction. It includes numerous examples showing mathematical solutions to pipe-friction problems and many useful tables. *87 pp. 8½x11-in; paper. $1.75 domestic, $1.85, foreign, The Hydraulic Institute, 122 E. 42nd St., New York 17, N. Y.*

Strategy and Tactics in Labor Relations, by Edward Peters. This manual is designed to help management and labor eliminate strikes by misunderstandings. It includes a study of the various strategies and tactics employed by various groups along with case histories. 256 pp. 5½x8-in; cloth. $4.50, National Foremen's Institute, Div. of Vision, Inc., 100 Garfield Ave., New London, Conn.

Energy Base of the Pacific Northwest Economy, by Endel J. Kolde. A comprehensive study of the energy base of the Pacific Northwest that brings together the essential facts on all the energy sources of the area and interprets them in their economic perspective. 282 pp. 8½x11-in; paper. $5, Bureau of Business, University of Washington, Seattle 5, Wash.

General Principles of Geology, by J. F. Kirkaldy, is a general text on geology and a starting point for specialized work on more limited aspects. 327 pp. 6x9-in; cloth. $6, Philosophical Library, Inc., 15 East 40th St., New York 16, N. Y.

The Protection of Structural Steel, by Joseph Bigos. An 8-pp pamphlet describing the factors in corrosion of steel and what type of protection is needed

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IN VIRGINIA—Charles Cavendish (left), federal coal mine inspector, and William H. Baldwin, mine foreman, Cox & Smith Coal Co., Whitewood, Va.

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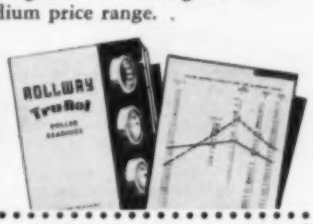

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Steel Mill and Coke By-Products Wastes, by W. W. Hodge. A description of the various wastes and how each is treated to reduce air and stream pollution. 18 pp. 8½x11; paper. Free. Mellon Institute, 4400 Fifth Ave., Pittsburgh 13, Pa.

Experiments in Fleissner Drying of North Dakota Lignite, by W. H. Oppelt, R. C. Ellman, O. C. Ongstad, and W. R. Kube. R. I. 5122. Bureau of Mines, Publications Distribution Section, 4800 Forbes St., Pittsburgh 13, Pa.

Falls of Roof, the No. 1 Killer at Bituminous Coal Mines, 1954. HSS No. 436. Bureau of Mines, U. S. Department of the Interior, Washington 25, D. C.

National Coal Group Visits W. Va. University

The Vocational Training and Education Committee, National Coal Association, held a meeting at West Virginia University May 6-7 with Roland C. Luther acting as chairman in the absence of Henry C. Woods. As part of its 14th visit to institutions of higher learning, the committee heard various members of the West Virginia University faculty describe curricula important to the study of coal, including those dealing with mining, civil, chemical and mechanical engineering; surveying; and geology. G. R. Spindler, director of the School of Mines, outlined programs developed at the school, showing that emphasis was placed on coal. Associates of Mr. Spindler reviewed such courses as mineral preparation, coal production, safety engineering, power applications, advanced mining, and equipment and machinery. The committee decided to hold the next meeting at the Michigan College of Mining and Technology, Houghton, Mich., Oct. 7-8, 1955.

Members of the committee present

COAL MEN ON THE JOB . . .

RED JACKET COAL CORP.—C. P. Ferguson (left), company preparation manager, Red Jacket, W. Va., and H. F. Williamson, tipple foreman, Mitchell Branch mine.

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were: David T. Beals III, vice president, Crowe Coal Co.; George E. Enos, vice president, Enos Coal Mining Co.; J. N. Geyer, vice president, Imperial Coal Corp.; Roland C. Luther, executive vice president, Peerless Coal & Coke Co.; C. R. Nailler, president, Christopher Coal Co.; V. D. Picklesimer, vice president, South-East Co.; James D. Reilly, vice president, Hanna Coal Co.; and Harry C. Walter, personnel manager, Lorain Coal & Dock Co. Dr. M. Edmund Speare and M. D. Cooper, National Coal Association, also attended, and E. A. Dines, head, Department of Mining Engineering, University of Pittsburgh, was present as a guest.

Scholarships Announced

A scholarship for the study of mining engineering at West Virginia University is being offered by the Semet-Solvay Div. of the Allied Chemical & Dye Corp. The scholarship, fourth in a series, carries an annual stipend of $600 and will be awarded for the 1955-56 school year, subject to renewal for a total of 4 yr. Applications, to be considered, must be mailed before July 1, 1955, and necessary forms and instructions may be obtained by writing to G. R. Spindler, director, School of Mines, West Virginia University, Morgantown, W. Va.

Three scholarships for the study of mining engineering are being offered by the Central Appalachian Section of the AIME. Each scholarship carries a stipend of $200 and is awarded for the school year 1955-56 or such part of that school year as the recipient of a scholarship can remain in school and do acceptable work. The scholarship will be awarded to high school graduates residing in the Central Appalachien Section of the AIME. One scholarship will be awarded in that part of Virginia, West Virginia and Kentucky included in the Central Appalachian Section. The scholarships may be used to study at any college or university within the section which has an approved 4-yr course in mining engineering. Applicants should address a letter, stating their wishes to be considered for a scholarship, to Charles T. Holland, secretary, Central Appalachian Section, P. O. Box 836, Blacksburg, Va. Only applications mailed by June 30, 1955, will be accepted.

A scholarship to study coal mining engineering at the University of Utah is being offered again this year by the U. S. Fuel Co., G. R. Watkins, general manager, has announced. The scholarship covers a 4-yr course leading to an engineering degree with payments at the rate of $500 per year. It begins with the 1955 fall quarter at the University of Utah but the successful applicant has the option of taking the first 2 yr at Carbon College. As circumstances permit, the scholarship recipient will be offered work during summer vacations at the company's mine. The scholarship is open to high school graduates who have completed their schooling since Jan. 1, 1954. Full information and application blanks may be obtained at the mine office, Hiawatha, Utah, or at 819 Newhouse Bldg., Salt Lake City, Utah.

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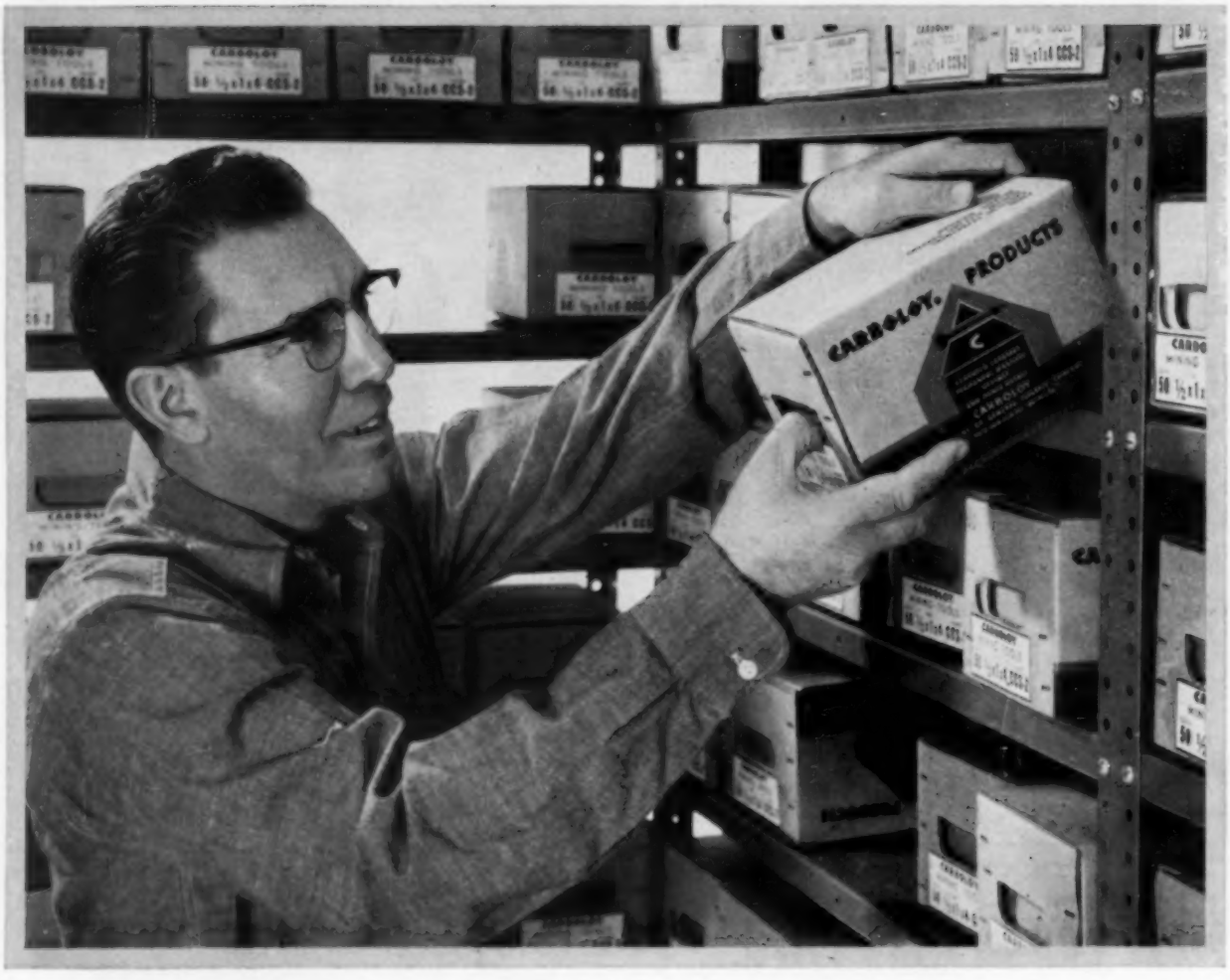

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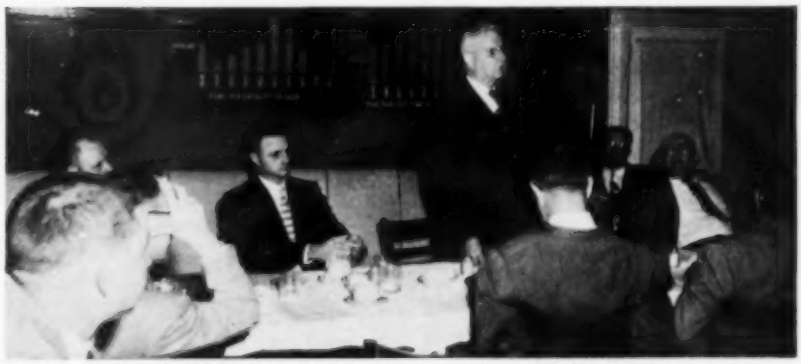
Association Men Active in Kentucky

KENTUCKY RIVER MINING INSTITUTE, at its dinner meeting April 22 in Hazard, featured a talk on "Management, and Employee Relations as They Pertain to Safety," by J. H. Mosgrove, secretary and safety director, Big Sandy-Elkhorn Coal Mining Institute. Shown above are: William Gay (left), engineer, Blue Diamond Coal Co.; William T. Cahoon, general superintendent, Carrs Fork Coal Co.; Robert Dickson, Kentucky River secretary and safety director; Mr. Mosgrove; and George W. Vaughn, institute vice president, and superintendent, Hardburly mine, Old King Mining Co.



AT A DINNER MEETING of the Big Sandy-Elkhorn Mining Institute, Pikeville, Ky., April 23, S. H. Ash, technical assistant, health and safety, USBM, spoke on "The Future of Diesel Equipment in Underground Coal Mines." J. H. Mosgrove (left), institute secretary and safety director; I. C. Spotte, general superintendent, Princess Elkhorn Coal Co.; Mr. Ash; C. H. Brown, chief clerk, Republic mine, Republic Steel Co.; and Dick Showers, foreman, Turner Elkhorn Mining Co.

SNAPPED IN THE OFFICES of the Big Sandy-Elkhorn Coal Operators' Association, Pikeville, Ky., are: N. T. Camacia (seated, left), general manager, Pond Creek Pocahontas Co.; and A. J. Bartlett, director of industrial relations, Island Creek Coal Co. and Pond Creek Pocahontas; J. H. Lyons (standing, left), office manager of the association; M. M. McCormick, superintendent, Elkhorn No. 3 mine, and R. M. Johnson, div. supt., Pond Creek Pocahontas Co.

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Among the Manufacturers

Lincoln Engineering Ups Officials

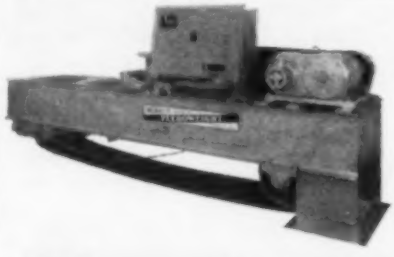
Lincoln Engineering Co., St. Louis, Mo., has elected Carl H. Mueller vice president in charge of engineering, and John E. Renner vice president in charge of sales. Both associated with the company for 20 yr, Mr. Mueller was formerly director of engineering and Mr. Renner, general sales manager. Robert E. Crean has been named as manager of the company's Philadelphia industrial branch sales office, succeeding M. C. Hazenfield, who has retired. Mr. Crean brings to his new position a varied experience from within the company in engineering, production, planning and sales.

Goyne Pump Appoints

The appointment of H. H. Buckley, 3802 Frankstown Ave., Pittsburgh 8, Pa., as sales representative for the Goyne Pump Co., Ashland, Pa., has been announced by Thos. S. Goyne, president. Mr. Buckley's territory will include the bituminous coal fields of Pennsylvania, the northern half of West Virginia and all of Ohio.

Pangborn Names Sales Manager

Arthur J. Buckley has been promoted to sales manager of Pangborn Corp., Hagerstown, Md. Mr. Buckley has served as assistant sales manager of the corporation since 1952, when he joined Pangborn after many years of sales work with Harnischfeger Corp. Charles Bultman, Pangborn Detroit district sales manager, has been transferred to the field sales department where he will assume responsibility for promotion of sales of new blast equipment. James G. Richeson has been appointed sales engineer and assistant to E. C. Gilmour, district manager in St. Louis and Kansas City.



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Manufacturers of

The Merrick WEIGHTOMETER, which weighs any material carried on a belt conveyor without interrupting conveyor operation. Complete descriptive matter on request.

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Engineers and Mfrs. of Automatic Weighing Equipment
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New Pa. Crusher Manager

J. Wm. Schulze, president of the Pennsylvania Crusher Div., Bath Iron Works Corp., West Chester, Pa., has announced the appointment of Harry J. Douglas as manager, succeeding John A. Plimpton, who has left the company. Lyle T. Johnston has been made sales manager. Mr. Douglas was previously assistant to the manager, and before that in the engineering and sales departments. Mr. Johnston has been a sales representative and advertising manager.

Heads Link-Belt Bearing Sales

Arthur E. Maha has been appointed sales manager of the Link-Belt Co. Dodge plant in Indianapolis, where the company's complete line of ball and roller bearings are made. Mr. Maha first joined Link-Belt in 1938, in the engineering department of the Dodge plant. Later he became a district sales engineer and since 1948 has been assistant sales manager. Mr. Maha succeeds the late G. Harold Woody.

Jeffrey Transfers Two

The transfer of two salesmen from the home office to district sales offices has been reported by the Jeffrey Mfg. Co., Columbus, Ohio. Paul H. Hamilton has been assigned to the Chicago sales territory, and Alva R. Judkins moves to the Pittsburgh sales territory. Both are members of the company's Conveyor Div.

Heads Carmet Mining Sales

Lloyd Oliver has been named supervisor, mining sales, Carmet Div., Allegheny Ludlum Steel Corp., Ferndale, Mich., according to an announcement by Marlin R. Hemphill, general manager of the division. Mr. Oliver joined the Carmet Div. as a sales engineer in 1954. He was previously associated with the Carboloy Div. of General Electric and Bohn Aluminum.

Willson Products Elects

Willson Products, Inc., Reading, Pa., established in 1870, has been purchased by Ray-O-Vac Co., Madison, Wis. J. Clyde Ryan, Ray-O-Vac executive vice president, was elected president and general manager of Willson Products, following the annual stockholders meeting April 12. Mr. Ryan succeeds Thomas A. Willson, elected chairman of the board of directors. Dr. Frederick Willson, chairman of the board since 1942, has retired. Thomas A. Willson Jr. was elected vice

president in charge of production and William C. Weeks, formerly sales manager, Distributor Div. of Ray-O-Vac, was named vice president in charge of sales.

USS Shifts Sales Personnel

Marcus J. Aurelius, vice president and general manager of sales, United States Steel Corp., has announced various appointments in district sales offices of the corporation, as follows: Samuel W. Off, appointed manager of sales in the Washington, D. C., office, from assistant to manager of sales in Washington; John J. Lennon Jr., previously assistant to manager of sales in New York, appointed manager of sales in the Buffalo office; Donald K. Wright, manager of sales in the Indianapolis office, from assistant manager of sales in Philadelphia; Boyd P. Doty Jr., formerly manager of sales at Buffalo, named assistant manager of sales in Philadelphia; John H. Morava, appointed manager of sales in the Chicago district sales office, from Chicago manager of sales in the industrial division; Wesley C. Bobbitt, formerly manager of sales in New York, made manager of sales in Philadelphia; Howard J. Mullin, new manager of sales in the New York office, succeeded as manager of sales in St. Louis by Edward W. Backes, formerly manager of sales, railroad division, in Chicago. Dwight L. Merrell and J. Gardner Brooks have been named assistant managers of sales in the Chicago district office. Mr. Merrell has been manager of sales in Philadelphia and Mr. Brooks assistant to manager of sales in the Chicago office.

Detroit Diesel Adds to Staff

The Detroit Diesel Engine Div., General Motors Corp., Detroit, has announced the appointment of five new representatives, advanced from home office sales and service departments in Detroit, to help man new sales and service zones created by a rearrangement of previously existing territories. The men appointed and their territories, as announced by E. F. Bentley, Detroit Diesel's general sales manager, are: G. R. Holly, sales representative, Arizona, New Mexico and Utah; Stanley Partel, sales representative, the Dakotas, Minnesota and eastern Iowa; K. L. Post, service representative, Colorado, Montana, Nebraska and Wyoming; Vance Shields, service representative, northern Illinois, Michigan and Wisconsin; and R. A. Stephens, service representative, western New York, Ohio, western Pennsylvania and West Virginia.

ESB Promotes Warren

H. H. Warren, former assistant manager of the New York branch sales office of the Electric Storage Battery Co., has been appointed assistant sales manager of the company's Exide Industrial Div., with headquarters in the general offices in Philadelphia. Associated with the company since 1921, Mr. Warren returned to Electric Storage Battery in New York as industrial products salesman following his war service and became assistant manager of the branch in 1948.

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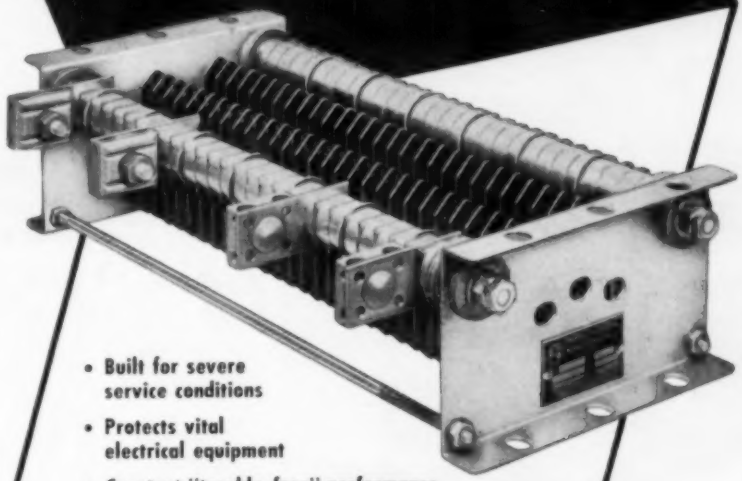

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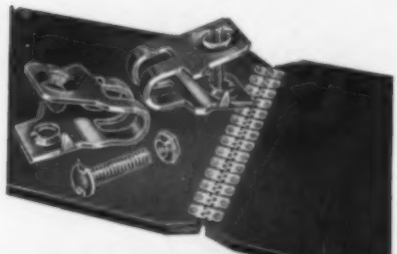

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Chellson, Ginder in New Coal Age Posts

H. C. Chellson (left), Pittsburgh district manager for *Coal Age* and *Engineering and Mining Journal* for the past 8 yr, has been named New York district manager for the two publications, succeeding T. E. Alcorn, who is retiring Sept. 1. William H. H. Ginder (right), market research and sales promotion manager for the two publications for the past 8 yr at the New York headquarters, has been named Pittsburgh district manager, succeeding Mr. Chellson. A former editor of *Mining Congress Journal*, Mr. Chellson rejoined McGraw-Hill in October, 1943, to become market research manager of *CA* and *E&MJ*, a post he held until moving to Pittsburgh. Previously he had been associate editor of *E&MJ* and also had been engaged in mining engineering, geology and operations in several parts of the United States, Mexico and Asia. Prior to joining McGraw-Hill in 1947, Mr. Ginder was associated with the former Carnegie Illinois Steel Corp., in Pittsburgh, in the operating, metallurgical and sales departments for 13 yr.

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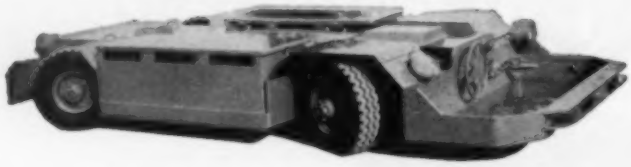

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U. S. Rubber Appoints

New sales assignments in the mechanical goods division, United States Rubber Co., New York, have been announced by Purdy Miller, manager of branch sales. Robert H. Bowman, formerly district manager at San Francisco, has been appointed to the same position in New York. New district manager for the Denver branch is Elmer G. Morrill, formerly a salesman in the Houston district. W. T. Pearl, salesman in the Tulsa district, has been appointed assistant district manager in Kansas City, and D. C. Lee, formerly a Dallas branch salesman, has been made assistant district manager in New Orleans.

Wallis Joins Schield-Bantam

The Schield Bantam Co., Waverly, Iowa, has named Buel M. Wallis general sales manager. Mr. Wallis formerly served as general sales manager of the Adams Div., Le Tourneau-Westinghouse Co., Indianapolis, and had been associated for 25 yr with the J. D. Adams Co.

Dwight-Lloyd Manager

Robert C. McDowell, president of McDowell Co., Inc., Cleveland, Ohio, has announced the appointment of Harold E. Rowen as general manager of the firm's new Dwight-Lloyd Div. Mr. Rowen was formerly vice president of Sintering Machinery Corp., of Netcong, N. J., producer of Dwight-Lloyd sintering machines, all assets of which were recently acquired by McDowell. Associated with Sintering since 1920, Mr. Rowen will con-

tinue to contact Dwight-Lloyd customers and will also be in charge of the Dwight-Lloyd laboratory, henceforth to be located in Cleveland.

BW-BJ Merger Proposed

R. C. Ingersoll, president of Borg-Warner Corp., and E. S. Dulin, president, Byron Jackson Co., have announced that they will recommend to their respective boards of directors merger of the two companies on a stock exchange basis. The announcement pointed out that the completion of the proposed merger would afford additional diversification to Borg-Warner's growing fields of industrial activity, while Byron Jackson would have the financial and technical assistance needed for its growing research programs for the development of new products and services. When merged, the Byron Jackson Co., established in 1872, will continue as an independent operating unit with no change in management, personnel or policy.

Peerless Pump Appoints

Peerless Pump Div., Food Machinery & Chemical Corp., Los Angeles, has appointed Carl L. Nickel product sales manager, water systems and dealer line products, and Norman C. Olson product sales manager, engineered line products. Both with the division since 1946, Mr. Nickel was previously a product sales manager and Mr. Olson a branch manager of the firm's Chicago office.

UWR Opens Alabama Warehouse

Union Wire Rope Corp., Kansas City, Mo., has announced the opening of a new and complete warehouse in Birmingham, Ala., to serve all of Alabama with the exception of the Mobile trade area, and the trade territories of Pensacola, Fla., and Chattanooga, Tenn., as well as the western half of Georgia. District manager of the new facility is Jim Lester who began in the Union Rope factory in 1943 and since 1948 has headquartered at the Oklahoma City branch. Bill Wall who has been traveling Kentucky, Virginia and West Virginia since 1953, has been transferred to Durham, N. C. where he will cover Virginia and North Carolina. Don Munsell from the Jacksonville, Fla., branch, has been assigned to territory comprising South Carolina, the eastern half of Georgia and Florida except Pensacola.

Cummins Engine Advances

C. R. Boll was elected vice president-sales and P. J. Every general sales manager of the Cummins Engine Co., Columbus, Ind., following the company's annual shareholders' meeting in April. Mr. Boll formerly was general sales manager of the company, and Mr. Every was recently promoted from manager of regions to assistant general sales manager.

Aeroquip Adds Subsidiary

Aeroquip Corp., Jackson, Mich., has announced the acquisition of Marman Products, Inc., Los Angeles, Calif., manufacturer of the Marman clamp widely used in the aircraft industry and related

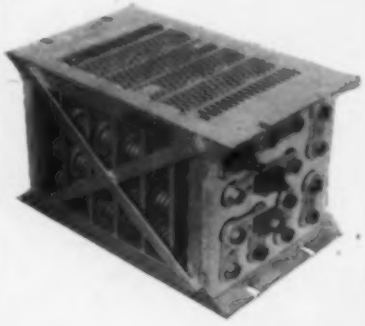
holds up the roof...

west virginia roof bolts

WEST VIRGINIA STEEL & MFG. CO.

HUNTINGTON, WEST VIRGINIA

GUYAN RESISTORS



Above is a typical design of all GUYAN RESISTORS including standard boxes and mining equipment resistors.

• • •

STRATEGIC LOCATION OF GUYAN QUALIFIED DISTRIBUTORS TO COAL MINING INDUSTRY

Athens Armature & Machine Works — Athens, Ohio
Bluefield Hardware Company — Bluefield, W. Va.
Cambridge Machine & Supply Co. — Cambridge, Ohio
Close Distributing Company — Pittsburgh, Pa.
Erwin Supply & Hardware Co. — McClure, Va.
W. M. Hales Company — Chicago and Danville, Ill.
H. A. Holden, Inc. — Minneapolis, Minnesota
Keith Brokerage — St. Johns, New Brunswick, Canada
Kentucky Mine Supply Company — Harlan, Kentucky
Carl Liem — Wilkes-Barre, Pennsylvania
Mechanical Mining Service Co. — Morgantown, W. Va.
Mill & Mine Supply Company — Birmingham, Alabama
Mine Service Company — Lothair, Kentucky
R. M. Regan — Middlesboro, Kentucky
Service Supply Company — Wheeling, West Virginia
Union Supply Company — Denver, Colorado
Universal Supply Company — Beckley, West Virginia
Wetzel Equipment Company — Salt Lake City, Utah

GUYAN MACHINERY CO.
LOGAN—WEST VIRGINIA

products. Peter F. Hurst, Aeroquip's president, described the acquisition as an important step in Aeroquip's program of expansion and diversification. The Marman purchase follows Aeroquip's acquisition in February of the hose line and fittings operations of its former Canadian licensee. The new Canadian company is Prenco-Aeroquip, Ltd., Toronto.

Syntron Appoints Div. Head

Syntron Co., Homer City, Pa., has announced two appointments in its Selenium Rectifier Div. C. W. Ramaley, sales application engineer for 3 yr, has been named manager of the rectifier department. James Scott replaces Mr. Ramaley.

Westinghouse To Make Torque Converters

The Schneider Mfg. Corp., Muncie, Ind., a wholly-owned subsidiary of the Westinghouse Electric Corp. purchased last October, has been dissolved to form the hydraulic drives department of the Westinghouse gearing division. The hydraulic drives department will sell, engineer and manufacture hydraulic torque converters and associated brakes and transmissions. "The entrance of Westinghouse into the torque converter field," L. A. Botsai, division manager said, "is a natural adjunct to the production of power-transmission equipment. Our production of torque converters and associated equipment at Muncie will be concerned mainly with industrial applications and not with equipment such as is involved in automobile transmissions." Three key appointments were announced for the new department: S. M. Johns, sales manager; T. P. Dunkin, manager of manufacturing; and P. L. Fosburg, engineering manager.

Simplicity Engineering Cited

Simplicity Engineering Co., Durand, Mich., recently was cited in a nationwide contest for its unusual safety record. In a contest covering metal-fabricating plants throughout the country sponsored by Michigan Mutual Liability Co., Simplicity Engineering was awarded second place. The award is even more significant when it is realized that during the calendar year 1954 Simplicity employees worked 384,080 hr with only two minor accidents resulting in only 19 days lost time. This is the largest number of hours worked by any of the participating companies. Simplicity has an accident frequency rate of only 5.2 per million hours worked, while the national average for all industries is 14.7.

New Alabama Chemical Plant

Ketona Chemical Corp., Ketona, Ala., has announced the award of a contract to the Fluor Corp., Ltd., Los Angeles, to design, engineer and construct facilities for the production of nitrogen solutions (ammoniated nitrate of ammonia) at Ketona's plant site near Tarrant, Ala. The added facilities, in addition to the ammonia-synthesis unit previously announced, will greatly improve Ketona's capacity to serve both agriculture and industry throughout the Southeast. The

Use REMA to add years of life to your Belts

REMA is the New and Amazing Self-Vulcanizing Rubber Repair Material

REMA REQUIRES
- NO HEAT
- NO HEAVY EQUIPMENT
- NO CURING TIME DELAY

• REMA is not just another cold patch. REMA is vulcanization by chemical process. The repaired area is sealed with an abrasive resistant cover stock patch. No heat or heavy vulcanizing equipment required. Here's the astonishing advantage—*when repair work is completed belts may be returned to service immediately.*

• REMA seals out moisture, reduces mildew, rot and deterioration — the great enemies of conveyor belts. Your own maintenance man can quickly repair your belt — it doesn't take a skilled belt mechanic to use REMA.

• Used for repair of all types of damaged spots, edge wear and for covering metallic joints. Available in introductory kits or parts separately.

Order from your Flexco-Alligator distributor
Write for Folder No. R4

FLEXIBLE STEEL LACING CO.
4638 Lexington St., Chicago 44, Ill.

REMA SELF-VULCANIZING
RUBBER REPAIR MATERIALS

Ketona plant, jointly owned by Alabama By-Products Corp., Birmingham, and Hercules Powder Co., Wilmington, Del., will begin production of ammonia in the late fall, while solutions production will follow early in 1956.

Fairbanks, Morse Expands

Fairbanks, Morse & Co. has formally opened a new sales and service headquarters at Fair Lawn, N. J., for a seven-state area including Connecticut, New York, New Jersey, Eastern Pennsylvania, Maryland, Delaware and Virginia. The company's Export Div. sales offices also are located in the new headquarters building. Designed to improve service to both domestic and export customers, the 50,000-sq ft building on a 5½-acre plot serves as a central shipping point for a wide variety of company products, as a model service center with equipment and skilled personnel for equipment repair, and as headquarters for the service erectors who install new equipment and make equipment repairs on the job-site.

And For Your Information . . .

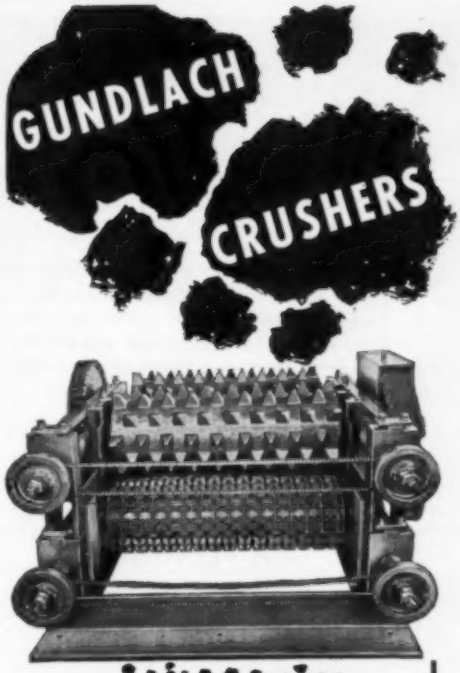
Penn Machine Co., Pittsburgh, has elected E. Gard Slocum vice president-planning, product and plant development. He previously had been chief industrial engineer for Jones & Laughlin Steel Corp. Mr. Slocum's election reflects Penn Machine's expansion plans to increase diversification of its industrial product lines.

The Timken Roller Bearing Co., Canton, Ohio, has been awarded a "Certificate of Management Excellence" from the American Institute of Management, and a shareholders' annual meeting award from the United Shareholders of America, Inc. The AIM award was presented to Timken for conformance with "sound management standards in all ten categories," while the USA award was given for good shareholder-management relations.

Harry C. Platt has been appointed president of the Engineered Castings Div., American Brake Shoe Co., succeeding N. G. Belury, recently appointed sales vice president for the company. Mr. Platt, formerly vice president in charge of production for the division, joined Brake Shoe in 1941 as a metallurgist.

Firth Sterling, Inc., Pittsburgh, has announced the appointment of Sanders & Lumberry, Inc., Peoria, Ill., and Perine Machinery & Supply Co., Seattle and Spokane, Wash., and Portland, Oreg., as authorized dealers for its "Firthite" line of high speed steels, tool and die steels and sintered tungsten carbides.

Huber-Warco Co., Marion, Ohio, has appointed the Bode-Finn Co., 2650 Spring Grove Ave., Cincinnati, Ohio, and its branch office in Dayton, Ohio, as distributors of its complete line. Ray J. Finn, president, is president of the Associated Equipment Distributors Association. Other officers are Albert H. Bode, secretary-treasurer; John M. Harrod, vice president; and George W. Blout, general manager.



SEE THE GUNDLACH CRUSHER DEMONSTRATED AT YOUR MINE

Whether or not you were one of the thousands that saw the Gundlach Crusher at the Cleveland Coal Show, have us demonstrate the many advantages of this crusher at your mine crushing your own coal.

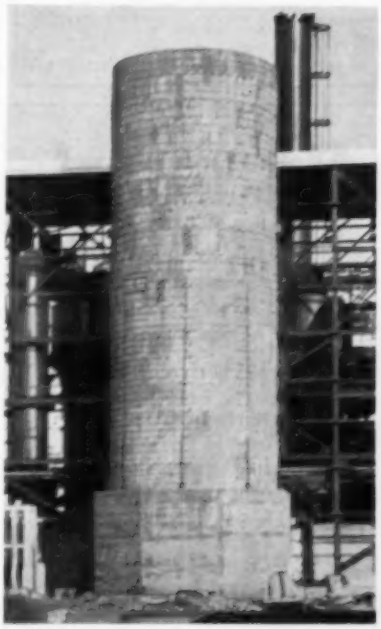
We are now planning our spring demonstration trips with our mobile unit. Telephone or wire at our expense, or write requesting a demonstration and we will advise you when to expect us. No obligation on your part, of course.

WRITE TODAY FOR A DEMONSTRATION AT YOUR MINE . . .

T. J. GUNDLACH MACHINE COMPANY

226 CENTREVILLE • BELLEVILLE, ILL.
Division of J.M.J. INDUSTRIES

NEFF & FRY Bin is fume stack for coal dryer



Seems like an odd use for a storage bin, doesn't it?

Fact is, our bins are extensively employed as stacks and chimneys. Being hollow structures, they admirably serve the purpose. What's more, they have the stability and endurance to stand up and take it.

The stack illustrated is 16 ft. inside diameter and 42½ ft. high. Fumes enter near the bottom. Close to the top is a perforated ring which sprays a fine mist of water across the stack. The fogging process precipitates dust and absorbs noxious gases, reducing contamination of the surrounding atmosphere.

Excess water drains from the bottom of the stack. Through a door in the hollow pedestal, sludge is removed from time to time.

The photo was taken while the coal preparation plant was being built.

If you want to know more on this subject, write or phone us.

THE NEFF & FRY CO. • 228 Elm St., Camden, Ohio

NEFF & FRY ➧ SUPER-CONCRETE STAVE STORAGE BINS

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Consulting Mining Engineer
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Continuous Consulting Service to Coal Mines
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Application—Supervision of Installation
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Modern Production Methods
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Consulting Engineers
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Coal Property Valuation
Industrial Engineering
Union Bldg. — Charleston, W. Va.

TEMPLETON-MATTHEWS CORPORATION
Designing Engineers—Consultants—Builders
MODERN COAL PREPARATION PLANTS THRU "CO-OPERATIVE ENGINEERING"
906-08 Sycamore Bldg. — Terre Haute, Indiana

PAUL WEIR COMPANY
MINING ENGINEERS and GEOLOGISTS
CONSULTANTS and MANAGERS
DESIGN and CONSTRUCTION
29 North Wacker Drive — Chicago 6, Illinois

J. W. WOOMER & ASSOCIATES
Consulting Mining Engineers
Modern Mines Systems and Designs
Foreign and Domestic Mining Reports
National Bank Building — Wheeling, W. Va.
Henry W. Oliver Bldg. — Pittsburgh, Penna.

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CLASSIFIED SEARCHLIGHT SECTION ADVERTISING

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$1.20 a line, minimum 3 lines. To figure advance payment count 5 average words as a line.

POSITION WANTED undisplayed advertising rate is one-half of the above rate, payable in advance.

BOX NUMBERS count as 1 line additional.

INFORMATION:

DISCOUNT OF 10% if full payment is made in advance of four consecutive insertions of undisplayed ads (not including proposals).

EQUIPMENT WANTED OR FOR SALE Advertisements acceptable only in Displayed Style.

New Employment Opportunities Section for Displayed ads starting July issue. For details see announcement ad in this section.

DISPLAYED RATE:

The advertising rate is $10.20 per inch for all advertising appearing on other than a contract basis. Contract rates quoted on request. AN ADVERTISING INCH is measured ⅞ inch vertically on one column, 3 columns—30 inches—to a page. C.A.

NEW ADVERTISEMENTS: Address N.Y. office, 330 W. 42 St., N.Y. 36, for July issue. Closing June 17th

RESEARCH AND DEVELOPMENT CHEMISTS

Opportunities for well-qualified chemists for research and development in heavy aromatic chemicals. Experience in coal tar chemistry or related fields desirable. Emphasis on recovery and purification of aromatic chemicals and development of derivatives and uses. All degree levels will be considered.

New air-conditioned laboratories are located on outskirts of Corpus Christi, Texas. Responses should include complete resumé of background and experience. Mail to Attention: Business Manager:

CELANESE CORPORATION OF AMERICA

P. O. BOX 8, CLARKWOOD, TEXAS

COAL PREPARATION ENGINEER

KAISER STEEL CORPORATION has opening for college graduate experienced in coal preparation or related field.

Position includes sampling, analysis and research projects at new coal preparation plant in conjunction with coal mining operation at Sunnyside, Utah.

Modern housing is available at reasonable rates. Send complete resume including salary requirements to Employment Office

KAISER STEEL CORPORATION

P.O. Box 217

FONTANA, CALIFORNIA

ATTENTION . . .

EMPLOYMENT ADVERTISERS

Effective with the July issue, a new section will start in COAL AGE. We will head this section: EMPLOYMENT OPPORTUNITIES. All Displayed Employment Opportunity advertising will be placed in this new section, with the exception of those advertisers who contract for run-of-book position. Advertisements in the EMPLOYMENT OPPORTUNITIES section will be billed at the new open rate of $12.00 per inch. Contract rates furnished on request. Advertisements are subject to Agency Commission. For full information write:

COAL AGE

330 West 42nd St., New York 36, N. Y.

FOR SALE

BATTERY CHARGER

1—20KW Hertner, type K, 143 volts, 140 amps, direct connected to 30 HP 220/440 volt motor complete with fully automatic charging panel.

CONVEYORS

Approx. 2000 ft. 26" Joy Belt Conveyor complete with six 20 HP and 30 HP 220 volt AC drives, and 4200 ft. of 26" four and five ply conveyor belt. Will sell all or any part.

COPPER

Several thousand feet of 1,000,000 CM bare wire wrapped on reels in lengths from 500 ft. to 1000 ft.
Several thousand feet of 500,000 CM bare copper wrapped on reels in lengths from 500 ft. to 1000 ft.
Several thousand feet 2/0, 3/con. armored, lead covered 2300 volt cable in lengths from 800 ft. to 1000 ft.
Several reels 2/0 and 4/0 drill hole cable, 400 ft. to 500 ft. lengths 2300 to 5000 volt, some armored and lead covered, rest armored but not lead covered, all 3 cond.
Several thousand feet #1 and 2/0, 3/cond. Trenchlay cable wrapped on reels 300 ft. to 500 ft. lengths.
Approx. 200 ft. of #6, 3/cond. 2300 volt armored cable.

CRUSHERS

We have all kinds of coal crushers, both single and double roll.

FANS

1—8' H-111-36 Joy Fan.
1—5' Jeffrey Aerodyne Fan.

LOADERS

4—11BU Joy Loaders, DC, 250 volts all with permissible plates.
Several 8BU Joy Loaders, both AC and DC.

LOCOMOTIVES

1—20 ton Goodman locomotive 42" gauge ball bearing, complete with armored steel frame, in perfect condition.
3—15 ton Jeffrey 42" gauge MH77 locomotives, just as good as new, complete with hydraulic brakes and ball bearing armatures and armored steel frame, built in 1947, equipped with heavy duty equipment making locomotive weigh 17 ton.
15—6 ton Mancha Battery locomotives 42" gauge, 48 cell, 27 and 29 plate Gould and Exide batteries.
3—15 ton Jeffrey 42" gauge MH77 locomotives, equipped with heavy duty equipment and complete with ball bearing armatures and armored steel frame, without hydraulic brakes.
5—15 ton Jeffrey MH74 locomotives ball bearing armatures, 42" gauge, with armored steel frame, in perfect condition.
5—15 ton Goodman ball bearing armature locomotives, 42" gauge complete with armored steel frame.
1—10 ton Jeffrey MH143, 42" gauge locomotive complete with ball bearing armature and journals, new type only used about one year.
2—8 ton Jeffrey locomotives 48" gauge, new in 1947 complete with ball bearing armatures and journals and armored steel frame.
2—10 ton General Electric locomotives ball bearing armatures, 48" gauge, complete with armored steel frame.
3—8 ton Goodman locomotives 36" gauge complete with ball bearing armatures, and armored steel frame, ready to go to work.
1—8 ton Goodman locomotive 42" gauge, bought in 1949, complete with ball bearing armature and ball bearing journals, has armored steel frame only used six months.
Several 8 ton Goodman locomotives 42" gauge complete with ball bearing armatures and armored steel frames.
25—6 ton Jeffrey MH88 locomotives 42" gauge complete with ball bearing armatures, overall length 13', height 30", width 48", wheelbase 42", with new type resistance, just as good as new.

MINING MACHINES

Several Joy 7B Mining machines, 250 volts DC, complete with 3' and 8½' cutter bars and bug dusters.
3—512 Goodman Mining machines, 250 volts DC., complete with T1 trucks or without trucks.

MOTOR GENERATORS

1—500KW Westinghouse MG set, 250 volts DC, 718 HP Westinghouse Motor 3/60/2300 volts, 1200 RPM with switchboard.
Several 300 KW, 200KW, 150KW MG sets, 250 volts DC, 2300 volts AC, 1200 RPM and 900 RPM.

ROTARY CONVERTORS

Several Rotary converters from 200KW to 300KW, all in perfect condition, new type 1200 RPM, just as good as new.

STEAM TURBINES

3—750 KW Allis Chalmers high pressure steam turbines, 937½ KVA, 235 amps, 3600 RPM, 3 phase, 60 cycle 2300 volts complete with switchboard.
1—300 KW Allis Chalmers steam turbine, 94 amps, 3 phase, 60 cycle, 2300 volts, complete with switchboard.

VIBRATORS

2—4' x 10' Selector single deck vibrators, can be made in two deck.
1—6' x 14' Robins-Gyrex double deck vibrator.
1—4' x 12' Deister single deck vibrator.
1—4' x 10' Robins two deck vibrator.
1—4' x 10' Stephens-Adamson two deck vibrator.
2—3" x 6' Simplicity single deck vibrators.

GAVENDA BROTHERS, Inc., Canton, Ill.

SHAFT HOISTS

We are in the market for single and two-drum mine shaft hoists. We have large market for all sizes.

W-6353 COAL AGE

520 N. Michigan Ave., Chicago 11, Ill.

FOR SALE:

A Roberts & Schaefer Super-Airflow Pneumatic Coal Cleaner, 6' Wide x 4'6" Long for 75tph of 1¼ x ⅜" Raw Coal. Plant located at Joanne Mine, Rachel, W. Va. For further information write or call:

JOANNE COAL CO.

1100 Union Trust Bldg., Pittsburgh 19, Pa.

Phone—ATlantic 1-1576

1148 FT. NEW 42 IN. BELT

3 ROLLS BRAND NEW RUBBER CONVEYOR BELT 6 PLY, 32 OZ., 3/16 IN. TOP, 1/16 BOTTOM.
NEVER USED. SAMPLES ON REQUEST.
PRICE ABOUT ½ NEW.

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COAL MINING PLANT FOR LEASE

Coal acreage located in celebrated Connellsville region of Western Pennsylvania, a superior quality metallurgical fuel. Minimum investment required to place mine in condition for immediate operation. Mine equipped with coal washery, coke ovens, etc. Approximate capacity 600 tons daily.

Address: BO 5983—Coal Age

330 West 42nd Street

New York 36, N. Y.

FOR SALE OR RENT

1 QUARRYMASTER DRILL

Equipped for forty foot (40') steel change. Entire unit in new condition and can be inspected on premises. Terms of sale or rental open to discussion.

GILBERTON COAL COMPANY

Phone Frackville 602 Gilberton, Penna.

TONSILS REMOVED $1.98

Would you trust your throat to a Doctor who advertised like this? Certainly not.
Then why trust your business to anyone who features price alone, on equipment they probably didn't ever own.
Buy from the Largest stock of the *Best* in Mining Equipment East of the Mississippi.

WE OWN WHAT WE ADVERTISE

All types of Joy Cutters, Loaders, Shuttle Cars, Cat Trucks, Belt Conveyors, Chain Conveyors, etc. Includes

JOY EQUIPMENT—rebuilt
1—Joy 3 JCM Continuous Miner, 34" hi.
2—Joy 14 BU, 7 BE Loaders, 10 H.P. head motors.
1—Joy 14 BU, Low Pedestal Loader, 30J head motors.
1—Joy 12 BU, 9E Loader, 26" hi. Rebuilt.
1—Joy 8 BU, type 11E, Loader.
1—Joy 11 BU, high capacity Loader.
4—Joy 32E9 Shuttle Cars.
8—Joy 32D Battery Cars.
2— Joy 42E13 Shuttle Cars.
4—Joy 42D Shuttle Cars.
1—Joy T1 Standard Cat Truck.
2—Joy T-2-S Cat Trucks, AC.
2—Joy Ladel MTB, 36" Belt Conveyors, 1000 Ft.
6—Joy Ladel 12" Chain Conveyors, 300 Ft.
2—Joy PLII-14 Elevators on rubber.
1—Joy PLII-5E Elevators.
1—Joy PLI-7E Elevators.
4—Joy 11B Cutting Machines, like new.
4—Joy 7B Cutting Machines, rebuilt.

LOCOMOTIVES
1—Jeffrey 15 ton, type MH-110, 250 volt, 48" Ga.
3—Jeffrey 10 ton, type MH-78, 42" and 44" Ga.
2—Jeffrey 13 ton, Motor Units, 115 H. P. complete with trucks.
2—Jeffrey 8 ton, type MH-110, 42", 44" and 48" Ga.
12—Jeffrey 6 ton, type MH-88, 42", 44" and 48" Ga.
2—Jeffrey 4 ton, type MH-96, 42" and 48" Ga.
3—G. E. 4 ton, type 825 Locomotives.
10—G. E. 6 ton, type 801, 803, 821 Locomotives, 42", 44" and 48" Ga.
1—G. E. 8 ton, type 822 Locomotive, 44" Ga.
3—G. E. 10 ton, type 800 Locomotives, 42", 44" and 48" Ga.
8—Goodman type 33, 6 ton, 44" and 48" Ga.
2—Goodman 8 ton, type 32A, 44" and 48" Ga.
1—Goodman 10 ton, type 34B, 48" Ga.
2—Goodman 13 ton, type 29A, 44" and 48" Ga.
6—Westinghouse, type 902, 4 ton.
2—Westinghouse type 904, 6 ton.
1—Westinghouse, type 907, 10 ton.
6—Gasoline and Diesel Locomotives, 4 to 20 tons.

TIPPLE EQUIPMENT
2—Cedar Rapids portable super tandem Screening Plants.
1—Allis Chalmers, 3' x 14' Ripple Vibrator.
1—4' x 10' Robbins Gyrex Vibrator.
2—Double Roll Crushers.
3—Single Roll Crushers.
Feeders, Drag Conveyors and Loading Booms.

CUTTING MACHINES
1—Jeffrey 29U on rubber.
1—Jeffrey 29C on rails.
6—Jeffrey 35L's, like new.
12—Jeffrey 35B and 35BB.
2—Jeffrey 29D's on track.
2—Jeffrey 29L, track mounted.
4—Jeffrey 29C, track mounted.
4—Baby Goodman 212's, rebuilt.
3—Goodman 312 Cutters, 18" hi.
3—Goodman 512 EJ Cutters.
15—Goodman 12AA and 112AA.
2—Goodman 224 Slabbers.
2—Goodman 724 Slabbers.

LOADING MACHINES
6—Joy Loaders, all types.
1—Jeffrey 61 CLR on rubber, 26".
2—Jeffrey 43L Shortwall Loaders.
3—Jeffrey L-500 Loaders.
2—Goodman 360 Loaders.
4—Myers Whaley No. 3 Automat Loaders.

CONVEYORS
10—Jeffrey 61 HG Face Conveyors.
12—Jeffrey 61 AM Room Conveyors, 300'.
4—61 EW Elevating Conveyors.
2—61 WH 15" Room Conveyors.
2—Joy 30" Belt Conveyors.
4—Joy Ladel UN-17 Shakers.
10—Goodman G-12½ and G-15 Shakers.

DIESEL PLANTS AND CONVERTERS
1—International 50 KW, DC.
1—75 KW, G. M. C., 6-71 DC.
2—Superior 100 KW, DC.
1—Cummins, 125 KW, DC.
1—Allis Chalmers 200 KVA, AC (Natural Gas).
2—100 KW, G. E. TCC-6 Rotaries.
3—150 KW, G. E. HCC-6 Rotaries.
3—200 KW, G. E. HCC-6 Rotaries.
1—200 KW, Allis Chalmers Rotary.
1—300 KW Westinghouse.
1—400 KW G. E. Rotary.
(All the above with 2300/4000-6900/13000 volt transformers.)
2—150 KW MG Sets, G. E. & Westinghouse.
1—200 KW MG Set, Westinghouse.
1—300 KW, MG Set, Westinghouse.

ROCK DUSTERS
1—MSA hi pressure on rubber.
1—MSA hi pressure on skids.
1—MSA low pressure Room Duster.
1—MSA hi pressure track mounted.
2—Canton Dustributors, lo-pressure.
1—Canton hi pressure, track mounted.

MISCELLANEOUS
400 Mine Cars, Drop Bottom and End Dump. All Gauges.
2—Brown Fayro HKL and HGD Car Spotters.
1—12 ton Differential Slate Larry.
4—Overhead Bridge Cranes.
1—Hardsoog Horizontal Drill.
1—Kanawha Hillside Dump.
1—16 Yd. Dragline Bucket.
5—Low Vein Water Cars.
Incline Hoists, 25 to 50 H. P.
Machine Tools for Mine Shops.
200 tons Rails, all sizes.
30 tons Copper Trolley and Feeder.
20 Electric Drills CP 572.
300 Transformers from 1 to 2000 KVA, 110 to 13000 Primary Volts.
300 Electric Motors, 3 to 200 HP.
Thousands of other items.

It Doesn't Cost—It Pays to Buy From

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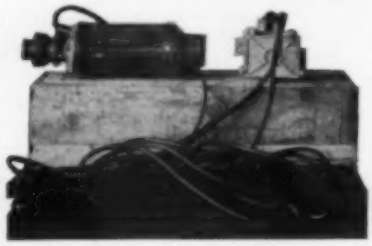
New Peerless Portable SUBMERSIBLE PUMPS



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1 Model 605 Koehring Shovel with Special Rock Bucket & Boom for Tunnel Work.
1 Model 104 Eimco Loader.
1 Model 9W Bucyrus Monighan Walking Dragline.
1 Model 200W Bucyrus Monighan Walking Dragline.
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1—10 HP Sullivan 3 drum
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3—Ottumwa 20 HP box car loaders
2—Manierre 22 HP box car loaders
1—Jeffrey 20 HP box car loader
2—Red Devil portable loaders, 12" x 15"
1—Card portable loader, 11'x19"

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1—Link Belt, 50' centers, 12" flights
1—Jeffrey, 75' centers, 9" flights
1—Jeffrey, 67' centers, 30" flights
1—Jeffrey, 72' centers, 30" flights
1—Jeffrey, 88' centers, 36" flights
1—Jeffrey drag, 28' centers, 9" drags
1—Jeffrey drag, 26' centers, 36" drags

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1—20 HP Vulcan,, single drum
1—22 HP Vulcan, double drum
1—25 HP Vulcan, single drum
1—30 HP Vulcan, single drum
1—37 HP single drum
5—50 HP single drum
2—60 HP single drum
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1—61W Jeffrey chain conveyor, 200'
9—G-20 Goodman shakers
6—G-15 Goodman shakers
8—Vulcan shakers
2—UN-17 Joy LaDel shakers
10—Goodman HA duckbills

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1—7B Sullivan super shortwall
18—Sullivan CE7
1—CR3 Sullivan
1—28A Jeffrey
6—112A Goodman

D.C.
4—7B Sullivan super shortwall
2—T-1 Sullivan crawler type trucks
7—12AB Goodman
1—CH-11 Sullivan ironclad
1—29C Jeffrey arcwall

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3—100 ton Fairbanks railroad scales
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1—48"x78" Jeffrey-Traylor electric
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1—3'x12' Symons single deck
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1—4'x12' Tyler Ty-rock 3 deck
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4—Joy model 60D3P, battery operated
7—Joy model 60D1, battery operated

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2—Card automatic self-dumping cages
2—108# Card bicycle sheave wheels
2—96" wood filled sheaves
2—84" Card bicycle sheave wheels
3—72" bicycle sheave wheels

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1—108" Joy La-Del axial flow fan, model L-14
1—8H Jeffrey 42" aerodyne fan
1—7" Jeffrey aerodyne 2 stage fan
6—Joy axivane series 1000 blowers, 5 HP
1—Jeffrey #61 blower, 1½ HP
7—Jeffrey aerodyne midget blowers, 1½ HP
1—2650cfm Brown-Fayro blower, 1½ HP
1—3600cfm Claridge blower, 3 HP

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1—20'x18" Link-Belt
1—41'6"x30" Card
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1—51'x48" Card
1—6.'x48"

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2—2½-3½ ton Mancha, 24" ga.
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3—8 ton ironton, 36" ga.
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1—10 KW Hertner, 150/181V., 15 HP motor, 440V. AC
1—11.5 KW West., 125 V., 17.5 HP, 440 V AC motor
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1—Joy battery charger, model U-248-20GE 126.5 volts 30 HP motor, 250 volts DC
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3—Wooton type P-48, 132 V., 30 HP motors, 250 V. DC

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1—7½ KW Century, 125 V., 15 HP motor, 440 V. AC
1—22 KW West. 125 V., 34 HP motor, 440 V. AC
1—40 KW Milwaukee 240 V., 50 HP motor, 440 V. AC
1—40 KW Imperial 250 V., 60 HP motor, 440 V. AC
1—75 KW Ft. Wayne 250 V., 100 HP motor, 440 V. AC
1—75 KW Ridgway 125 V., 115 HP motor, 2200 V. AC
1—165 KW G. E. 600 V., 300 HP syn. motor, 440 V. AC

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Three Westinghouse, 400 KVA, 22000-2300 volts
Three General Electric, 500 KVA, 22000-2300/4000Y volts.
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Transportation
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PARIS, ILL.

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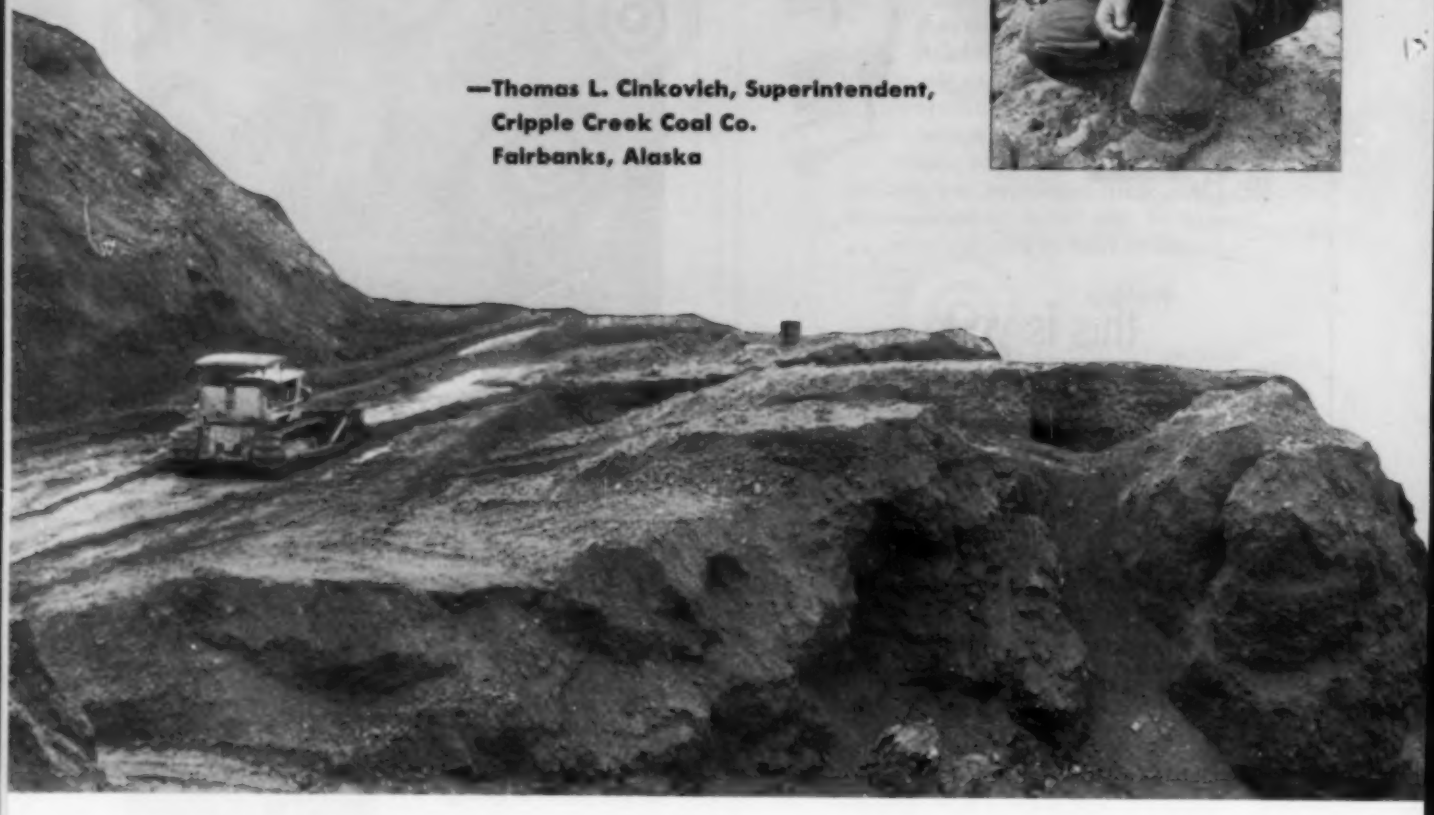
Fairbanks, Alaska



Up in Suntrana, Alaska, this Caterpillar D8 Tractor with No. 8U Bulldozer works the year around in temperatures as low as 50 degrees below zero. It is removing 50 ft. of frozen gravel overburden to open up a 57-ft. vein of sub-bituminous coal for Cripple Creek Coal Co. of Fairbanks.

When it isn't handling 300 to 400 cu. yds. of overburden per day, the CAT* D8 Tractor with versatile No. 8U Bulldozer is building roads. "It's really a honey—does a good job in all kinds of weather," reports Superintendent Thomas L. Cinkovich. The No. 8U is ideal for handling heaping, long-haul loads—*bigger loads with less end spillage than any other 'dozer.*

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WILL DEMONSTRATE

It's tire-tough, because it's built the way a tire is—with *an exclusive hose construction no other maker matches.*

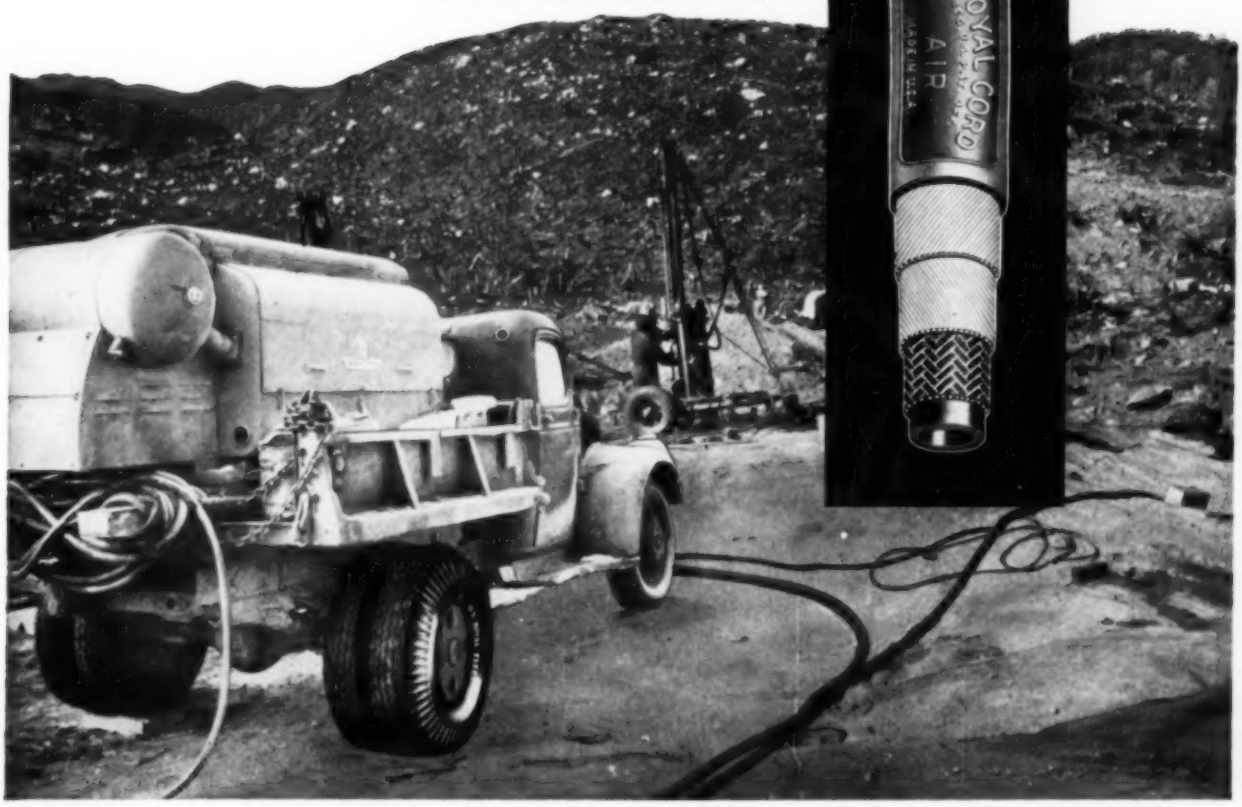
Proved in mines and quarries everywhere, U. S. Royal Cord Hose offers extremely high hydrostatic value, with a minimum of contraction and elongation. And with its great flexibility, shear resistance and toughness, it can be run over repeatedly by heavy equipment without harm.

Recommended particularly for applications where shock and excessive pressures are met, U. S. Royal Cord is available in continuous lengths from any of our 27 District Sales Offices, or by writing to the address below. *Whatever* your hose requirement, you'll find it pays to turn to "U. S." There's a job-engineered U. S. Hose for practically every purpose—an expert staff of "U.S." engineers to assist you in your hose selection.

This hose took a tip from a tire!

U.S. Royal Cord Air Hose

* tube of high quality neoprene for maximum oil resistance.
* braided cotton breaker ply anchors tube to carcass lastingly.
* Exclusive. Two counter-spiralled plies of tough special cord floated in resilient rubber for outstanding strength, shear resistance and flexibility.
* tough, brown natural rubber cover gives excellent cut and abrasion resistance—protects unique construction under extreme service conditions.



"U.S." Research perfects it..."U.S." Production builds it...U.S. Industry depends on it.

UNITED STATES RUBBER COMPANY

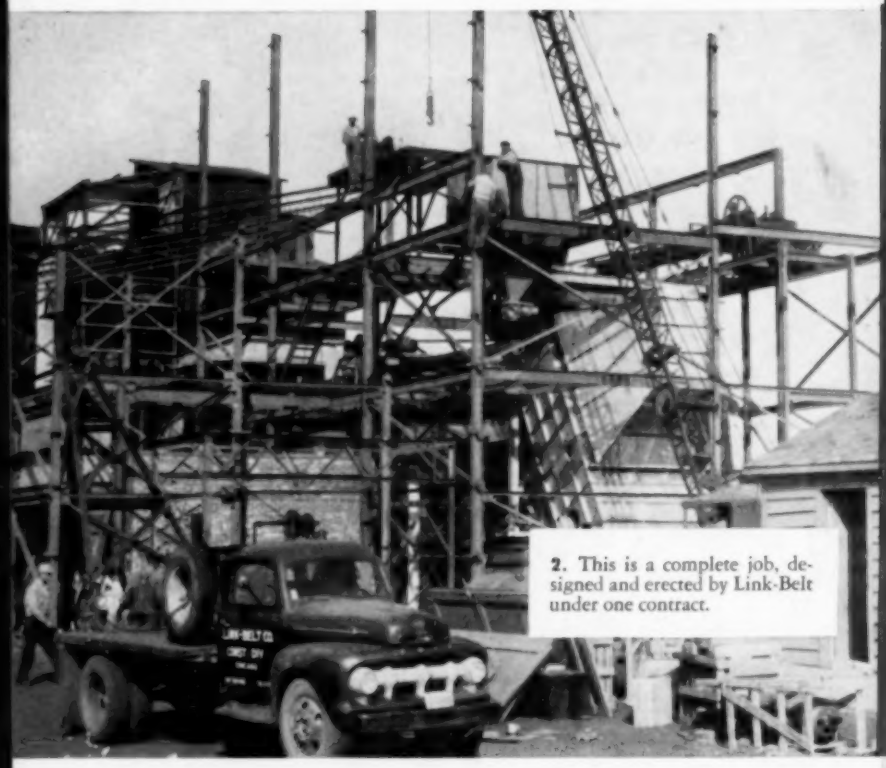
MECHANICAL GOODS DIVISION · ROCKEFELLER CENTER, NEW YORK 20, N. Y.

Hose • Belting • Expansion Joints • Rubber-to-metal Products • Oil Field Specialties • Plastic Pipe and Fittings • Grinding Wheels • Packings • Tapes Molded and Extruded Rubber and Plastic Products • Protective Linings and Coatings • Conductive Rubber • Adhesives • Roll Coverings • Mats and Matting

HERE'S WHY

more coal operators depend on LINK-BELT MULTI-LOUVRE than any other dryer!

1. Installation of two Multi-Louvre Dryers is first step in erection of modern coal drying plant.



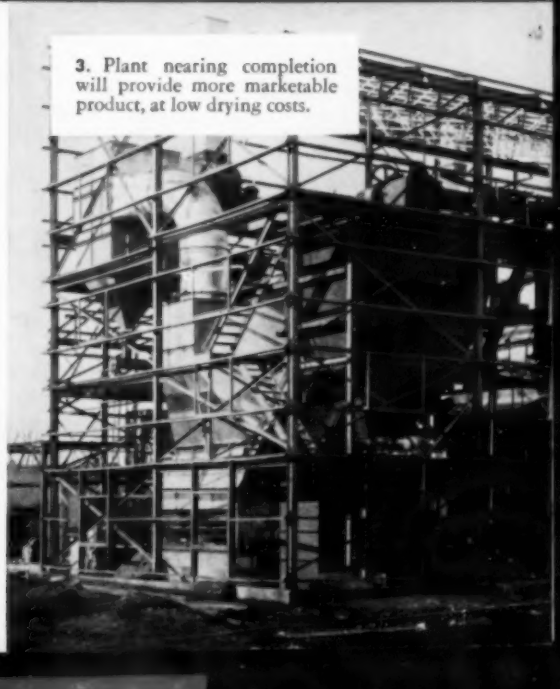
2. This is a complete job, designed and erected by Link-Belt under one contract.

- **Handles all sizes, up to 1½ in.**
- **Lower product temperature prevents oxidation — dried coal is 100° to 120° F.**
- **Minimizes explosion hazards — low air velocities reduce dust in air stream**
- **Lowers power consumption up to 50% — less horsepower needed**
- **Reduces maintenance costs due to simple design**
- **Lessens dusting and degradation because of gentle action of coal bed**

THE widely recognized superiority of the Link-Belt Multi-Louvre Dryer has made it the prevailing choice of the coal industry. In handling coal from 1½ in. to minus 28-mesh, it dries and cools with practically no degradation. Multi-Louvre's unique design permits low air velocity through the coal bed . . . reduces dust in the exhaust air stream . . . avoiding explosion hazards.

Equally important are Multi-Louvre's accurate, automatic controls which maintain low inlet air temperatures, prevent oxidation and insure uniform moisture reduction. What's more, with this efficiency you get substantial power and maintenance savings.

Learn how you can dry up to 150 tons of coal per hour with one Multi-Louvre Dryer. Call your nearby Link-Belt office or write for Book 2409.



3. Plant nearing completion will provide more marketable product, at low drying costs.

LINK-BELT

MULTI-LOUVRE DRYERS

LINK-BELT COMPANY: Chicago 9, Birmingham 3, Cleveland 15, Denver 2, Detroit 4, Huntington 9, W. Va., Indianapolis 6, Kansas City 8, Mo., Louisville 2, Pittsburgh 13, Seattle 4, St. Louis 1, Scarboro (Toronto 13), Springs (South Africa). 13.011